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**Working Paper**

## Factors influencing female labor force participation in Egypt and Germany: A comparative study

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on Multidisciplinary Panel Data Research

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826-2016

# Factors Influencing Female Labor Force Participation in Egypt and Germany: A Comparative Study

Sara Hassan Hosney

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**Faculty of Postgraduate Studies and Scientific Research  
German University in Cairo**

**Factors Influencing Female Labor Force Participation  
in Egypt and Germany: A Comparative Study**

**A thesis submitted in partial fulfillment of the requirements for the degree of  
Master of Science in Management**

**By**

**Sara Hassan Mohamed Hassan Hosney**

**Supervised by**

**Prof. Dr. Christian Mueller**

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**June 2015**

## **Abstract**

This paper aims to identify the major factors influencing female labor force participation (FLFP) in Egypt and Germany. On a narrow scope and given the unclear relationship between educational attainment and Egyptian FLFP, this paper seeks to examine the effect of educational attainment on the Egyptian FLFP while considering other personal and household factors. On a broader scope, the literature on FLFP illustrates that certain personal and household characteristics determine FLFP. However, the question remains, to what extent these determinants differ between Egypt and Germany. This paper attempts to shed light on understanding if and how specific demographic factors affect the Egyptian FLFP in comparison with the German FLFP. Limited dependent variable technique; Probit model is utilized to determine which factors influence FLFP in both countries. The cross sectional analysis is conducted through the use of the 2012 Egyptian Labor Market Panel Survey (ELMPS) in collaboration with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) and the 2012 German Socio-Economic Panel (SOEP). Findings indicate that indeed higher educational attainment increases the Egyptian female's predicted probability of participating in the labor market. Additionally, the comparative study showed that number of factors affect FLFP in both countries, some of which has a positive influence as years of schooling and age while others with a negative impact as being a married women, living in urban areas and number of children. On the other hand some other variables impact each country differently as wealth. Additionally, it was evident that years of schooling has a higher marginal impact on Egyptian FLFP yet, age, being married and number of children have a higher marginal effect on German FLFP.

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# Table of Contents

<b>List of Abbreviations.....</b>	<b>6</b>
<b>List of Symbols.....</b>	<b>7</b>
<b>List of Tables.....</b>	<b>8</b>
<b>List of Figures .....</b>	<b>9</b>
<b>1. Introduction .....</b>	<b>10</b>
<b>2. Literature Review .....</b>	<b>14</b>
<b>2.1 Female Labor Force Participation: Definition and Importance .....</b>	<b>14</b>
<b>2.2 Theoretical Framework .....</b>	<b>16</b>
2.2.1 Work-Leisure Choice Theory .....	16
2.2.2 Household Production Theory.....	17
2.2.3 Human Capital Theory.....	17
<b>2.3 Other Factors Influencing Female Labor Force Participation .....</b>	<b>19</b>
2.3.1 Level of Economic Development .....	19
2.3.2 Educational Attainment.....	20
2.3.3 Other Demographic Factors .....	22
<b>2.4 Female Labor Force Participation: Factual Outlook .....</b>	<b>25</b>
2.4.1 A Regional Perspective .....	25
2.4.2 The Egyptian and German Settings .....	27
2.4.3 World Development Indicators: Germany versus Egypt .....	28
<b>3. Empirical Approach and Data .....</b>	<b>32</b>
<b>3.1 Data Description .....</b>	<b>32</b>
<b>3.2 Variables Description and Model Estimation: Egyptian Model.....</b>	<b>34</b>
<b>3.3 Variables Description and Model Estimation: Comparative Model .....</b>	<b>38</b>
<b>4. Empirical Results .....</b>	<b>41</b>
<b>4.1 Empirical Results: Egyptian Model .....</b>	<b>41</b>
<b>4.2 Empirical Results: Comparative Model.....</b>	<b>51</b>
<b>5. Conclusion.....</b>	<b>69</b>
<b>6. References.....</b>	<b>71</b>

## List of Abbreviations

<b>CAPMAS</b>	Central Agency for Public Mobilization and Statistics
<b>ELMPS</b>	Egyptian Labor Market Panel Survey
<b>FLFP</b>	Female Labor Force Participation
<b>FLFPR</b>	Female Labor Force Participation Rate
<b>ILO</b>	International Labor Organization
<b>IMF</b>	International Monetary Fund
<b>MENA</b>	Middle East and North Africa
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>SOEP</b>	German Socio-Economic Panel



## List of Symbols

<b>FLFP<sub>E</sub></b>	Female Labor Force Participation – Egyptian Model
<b>FLFP<sub>C</sub></b>	Female Labor Force Participation – Comparative Model
<b>EA</b>	Educational Attainment
<b>PF</b>	Personal Factors
<b>HHF</b>	Household Factors
<b><math>\alpha</math></b>	Constant/intercept
<b><math>\beta, \delta</math> and <math>\gamma</math></b>	Estimated coefficient vectors measuring the effect of EA, PF and HHF respectively on <b>FLFP<sub>E</sub></b>
<b><math>\varepsilon</math></b>	Error term
<b><math>i</math></b>	Represents the number of individuals in the sample size, ranging from 1 to N, where N is the sample size.
<b><math>\mu</math></b>	Estimated coefficient measuring the effect of an additional year of schooling on <b>FLFP<sub>C</sub></b> .
<b><math>\rho</math> and <math>\sigma</math></b>	Estimated coefficient vectors measuring the effects of PF and HHF respectively on <b>FLFP<sub>C</sub></b> .

## List of Tables

Table 1: Female Share of Non-agricultural Activity, 2012 .....	15
Table 2: Variable Description in the Econometric Model – Egyptian Model (1) and (2) .....	34
Table 3: Variable Description in the Econometric Model – Comparative Model (3) and (4) .....	38
Table 4: Descriptive Statistics for Egyptian Data - 2012 .....	41
Table 5: Marginal Effects from the Probit Model Predicting Female Labor Force Participation in Egypt - 2012 .	43
Table 6: Descriptive Statistics for Combined, West Germany, East Germany and Egypt* - 2012.....	52
Table 7: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample of Germany and Egypt - 2012.....	54
Table 8: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample of West/East Germany and Egypt - 2012 .....	56
Table 9: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample using an interaction variable between Years of schooling and West/East Germany and Egypt.....	59
Table 10: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample using an interaction variable between country and all independent variables.....	62

## List of Figures

Figure 1: Female Labor Force Participation Rate for Six MENA and European Countries over Time.....	25
Figure 2: Real GDP per Capita US\$ in Germany and Egypt 2005-2013.....	28
Figure 3: Female Labor Force Participation in Germany and Egypt 2005-2013 .....	29
Figure 4: Female Unemployment Rate in Germany and Egypt 2005-2013 .....	29
Figure 5: Share of women employed in the nonagricultural sector in Germany and Egypt 2005-2012 (% of total nonagricultural employment) .....	30
Figure 6: Female employees in agricultural sector in Germany and Egypt 2005-2011 (% of female employment).....	30
Figure 7: Educational System in Egypt .....	36
Figure 8: Predicted Probability of Participating for an Average Egyptian Female by Educational Attainment.....	44
Figure 9: Egyptian Female Labor Force Participation by Educational Attainment and Marital Status.....	47
Figure 10: Egyptian Female Labor Force Participation by Educational Attainment and Residency .....	49
Figure 11: Predicted Probability of Participating for an Average Female by Country.....	55
Figure 12: Predicted Probability of Participating for an Average Female for West Germany, East Germany and Egypt.....	57
Figure 13: Female Labor Force Participation while interacting years of schooling with West Germany, East Germany and Egypt.....	60
Figure 14: Predicted Probability of Participating in Germany versus Egypt.....	65

# 1. Introduction

Women make up a little more than half of the world's population, but their contribution to measured economic activity, economic growth and well-being is way below its potential. According to the World Bank (2013) women now represent around 40 percent of the global labor force and more precisely on a country level women constitute around half of any country's human endowment. However, in most countries women labor force participation is much less than that of men. According to the IMF (2013), the average gender participation gap - which is the difference between male and female labor force participation rates - has been falling since 1990. However, it seems that this is due to a worldwide decline in male labor force participation rates rather than an increase in female labor participation rate, thus male-female differences still remain substantial.

Female labor force participation (FLFP) is important for the enhancement and socio-economic development of a nation because it promotes efficiency and equity. Generally, high female participation in the labor market implies two things; advancement in the economic and social position, and empowerment of women. This promotes equity and increases utilization of human potential, which can help in building a higher capacity for economic growth and poverty reduction (Mujahid 2014; Fatima and Sultana 2009). Understanding women's decision to supply labor to the market, as well as the factors that can encourage them to either participate in or opt out from the workforce, is vital for policy makers in order to efficiently help any economy develop and remain healthy. The clear understanding of such factors and their effect on women's propensity to participate plays a very important role in determining prospective growth and development of countries. It might help us come up with new ways to encourage female participation or address those problems that discourage females from participating in the labor market.

The economic analysis of FLFP has drawn considerable attention since the pioneering work of (Mincer 1962) as per the "Work-Leisure Theory" developed in the twentieth century. This was followed by several theories in the field including the "Household Production Theory" by Becker and Mincer and "Human Capital Theory" by Schultz and Becker. All of which tried to figure out on a simple basis, the factors that would affect the decision made by a female on whether to participate or not in the labor market. On the basis of those theories, vast amount of international research was conducted to analyze women's decision to be economically productive. Studies

conducted in Pakistan and the United States (Goldin 1994; Psacharopoulos and Tzannatos 1989; Sackey 2005; Schultz 1961) showed that women's participation is dependent on a country's level of development. Such a relationship was demonstrated in the U-shaped curve correlating FLFP with the country's GDP. Becker (1975), Psacharopoulos and Tzannatos (1989), Schultz (1961) and Khadim and Akram (2013) through studies undertaken in Kuwait, Pakistan, Nigeria and Egypt, illustrated that education is one of the main factors influencing women's tendency to participate. Most of those studies concluded that education for women maybe the main policy option available, if greater participation of females in the labor force is required. Furthermore, Psacharopoulos and Tzannatos (1989), Faridi, Chaudhry and Anwar (2009), Khadim and Akram (2013), Schultz (1961) and Agüero and Marks (2008) added that other demographic factors such as; marital status, age, household size, religion, geographical location (urban/rural residency) do impact women's participation decision.

According to previous literature, two main research gaps were found and are the main focus of this paper.

First off, as per most of the conducted research, findings suggest that education has a positive effect on FLFP, explained by the rationale that the more educated and skilled individuals are, the greater their income potential because education increases the opportunities for paid employment. However, Khadim and Akram (2013) found that FLFP decreases in Pakistan if the females' education level surpasses the matriculation level. Likewise Assaad and Krafft (2013) argued based on a study undertaken in Egypt that despite the fact that females educational level has been rising between 2006 and 2012, females labor force participation, especially in urban areas has declined. Both these studies recognize a new, and largely unexpected relationship between females' educational level and Female Labor Force Participation Rate (FLFPR). These findings are intriguing and show that there is a riddle that needs to be solved. With the current and continuing economic transition in Egypt certain determinants of FLFPR might have a different effect on FLFP other than what would naturally be expected. The new relationship pattern might be in fact a challenge to start expecting new relations and patterns between factors influencing FLFP and FLFPR. Understanding how the expected normal patterns would change would definitely help in addressing certain current economic problems related to the high female unemployment rate and low FLFPR. Accordingly, the first objective is to examine the effect of education on Egyptian FLFP while considering other personal and household factors.

Secondly, while previous academic articles demonstrated that certain personal and household factors in fact affect FLFP in Egypt; across the literature it is found that female participation patterns display a great divergence both across countries and over time. FLFP rates increased significantly in developed countries in recent years. In contrast, the female labor force participation rates show either a stagnated or a declining trend in most developing countries particularly in Middle East and North Africa (MENA) region. Women's participation in the economy has been and still is a major challenge facing the MENA region, especially that women's participation in the labor market is among the lowest throughout the world in these countries. Therefore, the question still remains if the relationship between such factors and FLFP is notably different in Egypt than the countries in the Global North who have been the focus of much of economic research and theories. Hence, the second and the even broader objective of this study is to compare FLFP between a developed country (Germany) and a developing country (Egypt). The major interest here was to find out what factors explain women's decision to participate or not participate in Egyptian and German labor markets. Thus, this paper attempts to shed light on understanding if and how specific demographic factors affect the Egyptian FLFP in comparison with the German FLFP.

The rest of the paper is organized as follows; next section gives an overview of FLFP; definition, importance and theoretical framework. Moreover, a glimpse on regional trends in FLFP and the Egyptian and German setting dictated specifically for the paper. Afterwards the empirical approach and the data description are presented. This includes a description of the variables and econometric models used for the given objectives of the paper. This is followed by the results, interpretation, and analysis of the output of the econometric models. The analysis of these results reflects not only the direction and magnitude of impact of the used variables on FLFP, but also the intuition behind the observed relationships. The final section briefly explains the main findings attributed to this paper and provides conclusions as well as policy implications arising from the empirical estimations.

In summary, the aim of this paper can be decomposed into two subsets as follows:

---

<b>Focus (1)</b>	
<b>Research Gap</b>	Unclear relationship between educational attainment and Egyptian FLFP.
<b>Research Question</b>	What is the effect of educational attainment and other personal and household factors on Egyptian FLFP?
<b>Methodology</b>	A limited dependent variable technique; Probit model is utilized to determine which factors influence FLFP in Egypt. The cross sectional analysis is conducted through the use of the 2012 Egyptian Labor Market Panel Survey (ELMPS) in collaboration with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS).

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<b>Focus (2)</b>	
<b>Research Gap</b>	Exploring the effect of personal and household factors on Egyptian FLFP versus German FLFP.
<b>Research Question</b>	Is the relationship between personal and household factors and FLFP notably different in Egypt than Germany?
<b>Methodology</b>	A limited dependent variable technique; Probit model is utilized to determine which factors influence FLFP in both countries. The cross sectional analysis is conducted through the use of the 2012 Egyptian Labor Market Panel Survey (ELMPS) in collaboration with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) and the 2012 German Socio-Economic Panel (SOEP).

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## **2. Literature Review**

### **2.1 Female Labor Force Participation: Definition and Importance**

Prior to discussing the importance of female's participation in the labor market and why most countries try to encourage females to be part of the labor supply, two important terminologies should be defined; Female Labor Force Participation (FLFP) and Female Labor Force Participation Rate (FLFPR).

FLFP was defined as the women's decision to be part of the economically active population: employed or unemployed population as compared to being part of the economically inactive population of the economy – those not working nor seeking work. The standard measure for FLFP is FLFPR. FLFPR is the proportion of the working age population that is economically active. It precisely measures the share of a country's female population aged 15-64 that engages actively in the labor market, either by working or looking for work. In measuring FLFPR, the number of females in the labor force is divided by the number of females in the working age population. This rate indicates the size of the female labor supply available to engage in the production of goods and services during a specified period. FLFP is an important indicator of women's status and benchmark of female empowerment in society (Kapsos, Silberman and Bourmpoula 2014; ILO).

Women are productive agents who possess equal productivity as men. This means that they have the potential to contribute as much as men do to any economy. That is why several economic gains can be made from the productivity of women through their participation in the labor force, (ILO). According to Mujahid (2014) and Fatima and Sultana (2009) the labor force participation rate plays an essential role in determining economic development and growth. Particularly FLFP is important for the enhancement and socio-economic development of a nation because it promotes efficiency and equity. Generally, high female participation in the labor market implies two things; advancement in the economic and social position and empowerment of women and hence promoting equity and increased utilization of human potential, which can help in building a higher capacity for economic growth and poverty reduction.



Table 1. below presents the most recent data on women's share of non-agricultural activity for four MENA region and four European countries. Countries are ranked according to their per capita GDP. It is interesting to see that in ranking these countries, women's share of non-agricultural activity roughly indicates levels of national economic development.

Table 1: Female Share of Non-agricultural Activity, 2012

<b>Country</b>	<b>Women's share of non-agricultural activity</b>	<b>GDP Per Capita (US\$)</b>
<b>West Bank &amp; Gaza</b>	17	2,782.9
<b>Egypt</b>	19	3,256.0
<b>Tunisia</b>	28	4,197.5
<b>Malta</b>	39	21,130.0
<b>Greece</b>	44	22,494.4
<b>Italy</b>	45	35,132.2
<b>Germany</b>	48	43,931.7
<b>Ireland</b>	52	48,391.3

Source: World Bank – World Bank Indicators, 2012.

Özsoy and Atlama (2009) and Fatima and Sultana (2009) added that higher FLFPR has been one of the long-term goals that countries; developed and developing try hardly to achieve. This is not only because it can directly yield growth and stability gains by mitigating the effect of a decline in the labor force participation on growth potential, but also because a higher workforce participation in the labor market increases labor supply, productivity and standard of living through reduction in poverty among women and children. Female participation in employment is crucial for extreme poverty alleviation because of its effect on income and therefore household welfare. Moreover, higher female participation could reduce the fiscal burden associated with providing welfare and social support to mothers and families. That is why Psacharopoulos and Tzannatos (1989) and Özsoy and Atlama (2009) concluded that generally low FLFP represents a significant missed opportunity to boost economic welfare and growth in many countries.

## **2.2 Theoretical Framework**

The theoretical framework on FLFP basically reflects the female's decision to be an active participant versus being an inactive participant in the labor market. Economists have tried to explain female's propensity to decide on one choice over another through analyzing the impact of certain economic and demographic factors, which they believed would affect female's tendency to participate or opt out of the labor market. The main theories that have been used to analyze the labor supply of women emerged in the 1960s. These include Mincer's "Work-Leisure Choice Theory", "Household Production Theory" by Mincer and Becker and "Human Capital Theory" by Schultz and Becker.

### **2.2.1 Work-Leisure Choice Theory**

The simplest analysis of women's choice goes back to the early 1960s to Mincer (1962) and the neoclassical microeconomic model known as; Work-Leisure Choice model, which assumed that households; suppliers of labor in an economy are rational and seek to maximize their utility; deciding on how much time to devote to work and how much time to devote for leisure. The trade-off happens when the female chooses how to allocate time between both alternatives. The trade-off is related to the opportunity cost associated with choosing one alternative over the other, in that the consumption of more leisure – less work results in less income and the opposite is true. The decision is then simply based upon the amount of income the market is willing to pay the female for the work devoted time relative to the value this female's time generates when consumed as leisure – assuming leisure is a normal good.

The Work-Leisure Choice model was also explained by Psacharopoulos and Tzannatos (1989) who further added that since the choice is based on the remuneration from work (wage rate) then the higher the wage rate, the less attractive leisure becomes and the more attractive work becomes. Such relation has two effects; substitution effect and income effect. Firstly, for whoever is not working, a higher wage may encourage them to join the labor market for that the opportunity cost of not working will be high; thus higher wages are said to stimulate higher participation. Secondly, for those already working, a higher wage makes work more attractive for that it has a higher rate of return than leisure. Encouraging participation or working more time as a result of an increase in the wage rate is known as the substitution effect as leisure time becomes more costly. Individuals then tend to devote more time for work rather than leisure. On the other

hand, as wage rate increases, an individual's real income rises this leads to an increase in the consumption of normal goods and if as previously assumed leisure is a normal good, the higher wage would persuade individuals to consume larger quantity (time) of leisure and reduce hours of work and that is known as the income effect resulting from a wage increase (FRF 1979; Heckman 2014).

### **2.2.2 Household Production Theory**

Following Mincer's Work-Leisure Choice theory, the theory of household production developed as per the Becker-Mincer research on human capital. Household Production theory is simply the study of household production, consumption and household time allocation. The theory states that families are both producers and consumers of goods. In an effort to maximize their utility, families attempt to efficiently allocate not only time but also income and the collection of goods and services they both use and produce. This theory defines household production as the production of goods and services by the household members, using their own capital and their own unpaid labor, all for their own consumption (Ehrenberg and Smith 2012).

Ehrenberg and Smith (2012) added that three different models were used to analyze the household theory. Model one assumes that household production and market production are the same. Thus work is defined in terms of both household and market production, and the choice is just between work and leisure. Model two considers that part of the time spent at home is not used in leisure only but rather household production activities as cooking, cleaning and childcare. Upon such consideration, work is said to differ on whether it is related to household production or market production. The third model defined work as a choice between three alternatives; household work, market work and leisure.

### **2.2.3 Human Capital Theory**

Subsequent to the household production theory, the human capital theory evolved. According to Becker (1975) human capital can be defined as the productive investments embodied in individuals, including skills, abilities, knowledge, habits, and social attributes often resulting from expenditures on education, on-the-job training programs, and medical care. The basic concepts of human capital suggested that individuals develop their capacities to improve career prospects and thus generate income through investment in education and on-the-job training as well as health care. The theory stresses the significance of education and training as the key to

participation in the labor market. This is because based on the human capital theory, education and training are regarded as investments that increase individual's productivity and improve the individual's chances of gaining a higher occupational status and hence higher earnings. The theory further illustrates that the more educated individuals are the more they will be willing to participate in the labor market so that they can take advantage of the positive relationship between education and wage rates.

The human capital theory was then used to analyze the relationship between labor force participation and education specifically for married women. Economists argue that the relationship may be U-shaped across educational attainment categories. Accordingly, participation rate were found to be high for illiterate women, lower for women at the primary and secondary educational level and higher for university graduates. The positive relation between education and wage rate can explain such U-shaped relationship (Schultz 1961). Higher labor force participation at low levels of education – illiterate and thus low wages can be explained by the need to earn some income for survival – subsistence wage. Furthermore, the low level of participation for married women with primary and secondary level of education might be explained by that women with such low level of education mostly seek job opportunities only in specific occupations such as secretarial work. Thus when there is shortage in such jobs, women with such low educational attainment tend to stay home. Besides that it is common in most developing countries that women with lower levels of education to work in the household – household production or in the informal sector, which is excluded from the definition of the labor force. Consequently informal sector workers are not included in the labor force and thus not reflected in the FLFPR, therefore, indicating a low female participation rate (Cameron et al. 2001; Lincove 2005; Schultz 1961).

Based on the pioneering theories of Mincer, Becker and Schultz several studies have been conducted in different countries to analyze the labor supply of women and to investigate what factors affect women's propensity to be an active participant in the labor market.

## 2.3 Other Factors Influencing Female Labor Force Participation

### 2.3.1 Level of Economic Development

Despite the fact that some of the above mentioned theories; work-leisure choice model and household production theory helped in explaining FLFP, such models provide explanations of labor force participation at a specific point in time. With respect to time trends it is generally important to look at the movement of aggregate labor supply and demand. One way economists tried to explain how the labor market is altered over time was through analyzing the relation between the process of economic development and labor force participation in several countries.

While women's labor force participation tends to increase with economic development, the relationship is not straightforward or consistent at the country level. As previously indicated through the economic analysis of FLFP, it was clear that women's full integration into the economy was and still is a desirable goal for equity and efficiency. However, international comparisons show that FLFP is high in low-income countries and in highly developed countries, and comparatively low in middle-income countries, creating a U-shaped relationship between national income – GDP and FLFP. Sinha (1967) first suggested the U-shaped female participation curve in the late 1960s in his study entitled, "Dynamics of Female Participation in Economic Activity in Developing Economy". It was observed that female's participation tend to change with the growth stages of an economy. Very poor countries tend to have high female participation, which then fall at the early stages of economic growth and then increase back at later stages. More precisely Sinha's study proved that female participation rate tends to decline at early stages of industrialization but later as the economy grows, it begins to rise. The rationale behind this was that during the primary stages of industrialization, agriculture loses its importance as the main employer of women. The growth of industry is usually slower than the shrinkage of agriculture. These opposite, but not necessarily offsetting, movements usually result in an initial decline of female employment. When the governmental and service sectors expand, women are drawn back into the labor market. These conditions give rise to a U-shaped pattern of female employment in the process of development (Fatima and Sultana 2009; Psacharopoulos and Tzannatos 1989; Sackey 2005; Schultz 1961; Goldin 1994; Mammen and Paxson 2000).

Several cross-country studies were undertaken to interpret changes in women's employment across the process of economic development and to analyze if the U-shaped curve truly exist or not. Looking into international evidence from different countries, Fatima and Sultana (2009) were able to confirm the existence of the U-shaped relationship between FLFP and economic development in a case study undertaken in Pakistan. The results of that study indicated that FLFP increased vastly in recent years while, the level of economic development also rose. Generally, it was concluded that a high rate of economic development does actually encourage the female participation in the labor market by increasing the work opportunities for females. Besides, in such periods of economic transformation, females tend to take full advantage of such opportunities by increasing their level of educational attainment. Likewise, Goldin (1994) uncovered the existence of a U-shaped functional relationship in the United States. Through the historical records on women's work it was found that the rise in FLFP that was obvious in the United States in the twentieth century was due to the growth of white-collar jobs, largely in the clerical sector, that were acceptable forms of employment for women. Similarly, gains in female education, both in absolute terms and compared to male education level, made such white-collar jobs manageable for women and this encouraged women to work away from home.

### **2.3.2 Educational Attainment**

With respect to the U-shaped curve– showing the relationship between economic growth and FLFP just discussed, theories indicated that the U-shaped curve rely implicitly or explicitly on economic growth being correlated with increases in female access to education. The upward slope of the U-shaped curve is usually explained by how literate women are. Gains in female education made white-collar jobs more attainable for women and increased the incentives of women to participate in the labor market (Tsani et al. 2012). That is why literacy is essential for the upward slope of the U-shaped curve where women have access to jobs that reward education. Such educational effects are then of great importance for policy makers because encouraging females' education is a central long term development strategy (Lincove 2005; Mammen and Paxson 2000). Yet, that is not the only reason why educating females is of great importance.

Education is usually considered the incentive for a better employment, which therefore from a supply-side perspective should influence any individual's decision on whether to join the labor market or not. Consequently, it has been found that educational attainment is the most effective determinant of labor force participation rate in both developing and developed economies.

Particularly, studies of female's labor force participation suggest that the most important personal variable influencing FLFPR is education. The hypothesis that education can be generally treated as an investment in human capital has proved to be influential and helpful in its own way and to be a key ingredient in studies of the sources of economic development and the distribution of income all over the world. Education is mostly regarded as a specialized form of human capital, contribution of which to economic growth is noteworthy. Human capital theory proposes that just as physical capital – machines enhances people's economic efficiency, so human capital acquired through education improves the productivity and efficiency of individuals. Studies of the sources of economic growth credibly confirm that education plays a major role in increasing output per worker. In accordance, the new development theories in economics shed light on the importance of education and human resource development for long-term economic growth. It is usually regarded as the catalyst or engine of growth and development in the new world economy (Becker 1975; Psacharopoulos and Tzannatos 1989; Taubman and Wales 1975; OECD 1989).

According to Psacharopoulos and Tzannatos (1989) education for women maybe the main policy option available, if greater participation of females in the labor force is desired. Given that in theory, education has a positive effect on FLFP explained by the rationale that the more educated and skilled individuals are, the greater their income potential because education increases the opportunities for paid employment. This was confirmed through different studies undertaken in Kuwait, Pakistan and Nigeria. Moreover, Brenke (2015) reasoned the increasing share of women in the German labor market by women's higher educational attainment which made them more qualified to participate in the labor market. However, Khadim and Akram (2013) found that FLFP decreases in Pakistan if the females' education level surpasses the matriculation level. Likewise, Assaad and Krafft (2013) argued based on a study undertaken in Egypt that despite the fact that females' educational level has been rising between 2006 and 2012, FLFP, especially in urban areas has declined.

Most economic analysis focused on the returns from educational investment and the contribution of education to earnings and hence production capacity. In the early nineties, it was hypothesized that differences in earnings by educational attainment level represent nothing but the net effect of education and therefore differences in earnings represent increase in productivity produced by such educational attainment. Improved women's labor force participation because of earnings potential was considered the central benefit of educating women (Becker 1975; Schultz 1961).

Additionally it was empirically proven that the return to education among women is much higher than men. This implies that women should have a higher incentive to invest in education than men. Additional research and economic studies indicated that earnings are not the only aspect affected by women's education. From a neoclassical point of view education affects the fertility rate of women explained by the rationale that as investment in human capital increases and as more women participate in the labor market, the fertility behavior of households is likely to change, in favor of having less children. Looking into international evidence, (Lam and Duryea 1999) illustrated through a study undertaken in Brazil, that education decreases the fertility rate of women as compared to their uneducated counterparts and reduces family size, which in the long run encourage women to participate in the labor market. This relationship was explained by Sackey (2005) and Mujahid (2014) who demonstrated that educated women shall face higher opportunity cost if their decision was to increase the number of children and not participate in the labor market after acquiring higher education.

### **2.3.3 Other Demographic Factors**

The importance and effect of education on FLFP cannot be neglected, but it cannot be the sole factor being looked upon if changes in FLFP are to be understood. Looking into international evidence for different countries, Psacharopoulos and Tzannatos (1989) found that aside from education, factors such as age and fertility and religion affect the FLFPR irrespective of the country under investigation. In addition, Uwakwe (2004) agreed on most of the factors already stated and added that in Nigeria family responsibilities, pregnancy, and physical factors; nutrition, water and health services as well affect the FLFPR. Moreover, the State and Planning Organization of Turkey and the World Bank (2010) pointed out that the FLFP in Turkey is multidimensional and is affected by both socioeconomic and cultural factors including; house responsibilities and childcare/eldercare, urbanization, marital status. Faridi, Chaudhry and Anwar (2009) further added that close relatives' educational status, household assets, spouse participation in economic activities, number of children, age of children and husband salary influence the female's decision on whether to participate or not participate in the labor market. As related to a study undertaken in Pakistan, Khadim and Akram (2013) broadly listed three categories of factors that explain female participation in economic activity; individual and demographic factors (age, education, marital status), socio economic condition factors (per capita income of the household, number of dependents, household type), geographic location factors (urban and rural residence).



Women's age, marital status and fertility behavior are of great importance with regard to their labor force participation decisions. Women in their twenties and thirties have higher chances to participate in the labor market as compared to their counterparts in other age groups. On one hand it was empirically proven through a study undertaken in Kuwait and Jordan that age negatively affects FLFP. On the other hand, a study undertaken in Pakistan has showed that the effect of age on FLFP is positive only up till the age of 49, which after then negatively affects women's tendency to participate in the labor market. It was then concluded that age could positively or negatively affect FLFP, all based on the age group considered. In addition of age consideration, the impact of marriage on women's propensity to participate in the labor market should not be disregarded. Pakistan as many other developing countries considers married women to be the one fully responsible for household activities; cleaning, washing and cooking and the husband is the one responsible to work away from home for wage (Psacharopoulos and Tzannatos 1989; Khadim and Akram 2013). This cultural consideration reduces the female's probability to join the labor market because the household tasks undertaken are regarded as work – unpaid work.

On the other hand, such negative impact on FLFP rarely happens in developed economies, except when marriage is accompanied by children. With respect to time, work and children make simultaneous requirements, the more time devoted for one, the less would be available for the other, especially if childcare arrangements are not available. Women usually face the responsibilities associated with raising children, which leaves women with no time or effort to enter the labor market especially if those children are of young age. Children influence the opportunity cost of market work. On the other hand, some studies undertaken in developing countries where the fertility rate is usually high pointed out that the presence of children has two effects on FLFP. On one hand, as the women start having children, it is expected either that women stay home and refuse entering the labor market. On the second hand, as the number of children increase per women, husband's income becomes insufficient to handle the increased size of the household, which then pushes the female to participate in the labor market in order to reduce the financial pressure accompanied by the greater number of family dependencies. Despite the fact that most research indicates that the higher the fertility rate the lower the FLFP, yet at least one study that analyzed 26 low-middle income countries, concluded that number of children has no effect on female's work intensity nor FLFP (Khadim and Akram 2013; Psacharopoulos and Tzannatos 1989; Mujahid 2014; Schultz 1961; Agüero and Marks 2008).

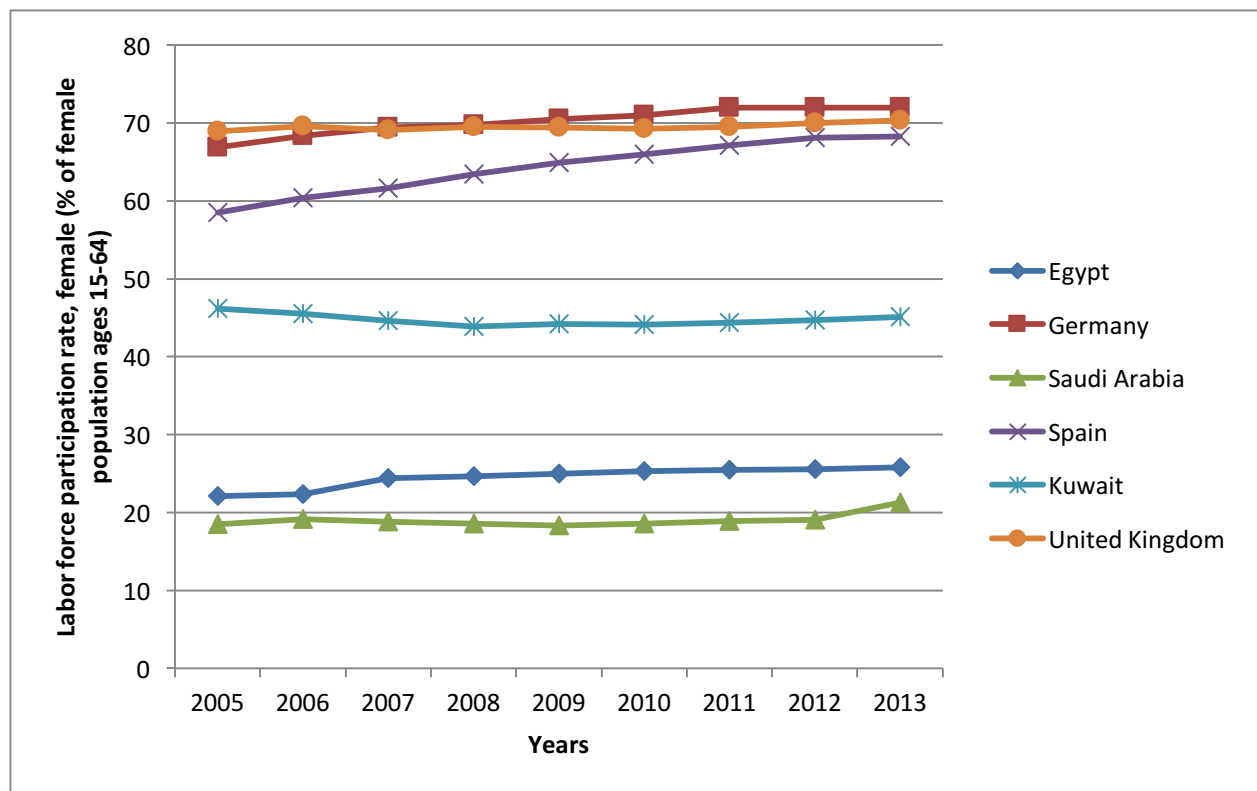
Based on the vast amount of literature on FLFP and based on the founding theories of Mincer, Becker and Schultz, it can be inferred that numerous economic and sociological factors do in a way or another affect FLFP. Economic and sociological factors might affect the labor force participation decision of women differently if cross-sectional studies are undertaken. The following section looks into the FLFP from a wider perspective specifically MENA and European FLFP.

## 2.4 Female Labor Force Participation: Factual Outlook

### 2.4.1 A Regional Perspective

According to the World Bank, women in the MENA region countries enter labor markets at half the global rate. That is despite the fact that the MENA region countries have taken admirable progresses over the past decades to shrink gender gaps in areas such as education, health and mortality. But surprisingly, such human capital investments have not been matched by a rise in women's economic nor political participation. (ILO) agreed that FLFP in the MENA region is considerably lower than any other region in the world and added that such a trend has been consistent throughout the region's history despite periods of high levels of development, higher economic growth, lower female illiteracy rates, and lower fertility rates than in at least one other region in the world. Women's participation in the MENA region as compared to Europe reveals a number of puzzles. Most notable is the stagnated below world average FLFPR in most MENA region countries as compared to European countries.

Figure 1: Female Labor Force Participation Rate for Six MENA and European Countries over Time



Source: World Bank – World Development Indicators.

Figure 1 above portrays how FLFPR of three European (Germany, Spain and United Kingdom), and three MENA region (Egypt, Saudi Arabia and Kuwait) countries changed from 2005 to 2013. According to the World Bank and as shown in figure 1, FLFPR for the three MENA region countries have been always below that of the three European countries and have been stuck at low FLFPR since a long period of time (2005-2013). Such lower participation rates go back to the fact that the participation of women in the labor market reflects differences in economic development, cultural values, religion, beliefs, social norms, education levels, fertility rates, and access to childcare services. For this reason, the economics literature initially tried explaining on a country level how FLFP is affected by standard economic variables such as the country's level of development, women's education, fertility and marital status prospects of women. Recent literature started looking at the variations in FLFP across countries and explained that those variations tend to be driven by a wide variety of factors not only economic factors – economic growth and women's educational attainment, but also some of which are social factors (Psacharopoulos and Tzannatos 1989; Agüero and Marks 2008).

FLFP in developing countries is considerably different from that in developed countries. This has been empirically proven through the U-shaped female participation curve theory. While indeed the level of economic development can explain why there is such a huge difference in FLFPR between European and MENA region countries, yet that is just part of the big picture. The determinants of FLFP are numerous, all of which directly or indirectly affect the women's decision on whether to enter the labor market or not. Despite the fact that the relationship between FLFP and these determinants is complex, especially if cross-country analysis is considered, yet exploring how certain factors affect FLFP in different countries is of great importance. Policy makers would have a glimpse on how to encourage female participation or address current problems that discourage females from participating in the labor market. Moreover, understanding how the expected normal patterns of the relation between FLFP and certain factors would change would definitely help in addressing certain ongoing economic problems related to the high female unemployment rate and low FLFPR. Additionally, identifying the reason behind a change in the FLFPR would be helpful in building higher capacity for economic growth and poverty reduction due to a better and more efficient use of human capital available.

### 2.4.2 The Egyptian and German Settings

This section discusses the most recent trends in FLFPR, female literacy rates and economic development in two countries, Egypt (MENA region country) and Germany (European country). Those two countries have been particularly chosen for comparison for two main reasons; firstly, for the availability of data and secondly, for that the two countries differ on many levels; level of economic growth, literacy rates, social norms and culture, which would give us an idea on how different country conditions and population characteristics might affect FLFP in both countries.

The World Bank (2012) stated that Egypt's economic growth remained weak after the 2011 revolution, and unemployment continued to be a prevailing concern, especially for women, which was unsurprising given that Egypt has been going through dramatic political and economic transformations for the last three consecutive years. Furthermore, Assad and Krafft (2013) found that unemployment has increased, under-employment has increased extensively and employment rates and labor force participation among women have declined. More specifically the 2013 Global Gender Gap Report which considers Egypt to be a low-middle income country – developing country, ranks Egypt 125<sup>th</sup> out of 136 countries in terms of women's economic participation and opportunity.

Sieverding (2012) added that FLFP among youth is very low and pointed out that female youth face higher unemployment rates and longer unemployment durations compared to their male counterparts. Additionally, Assad and Krafft (2013) stated that despite the fact that women's educational attainment has been rising over the past 25 years, yet the increase in FLFP has not been witnessed and female's unemployment rates continued to climb. This was specifically obvious in the public sector employment, which had notably worsened the opportunity structure of educated women.

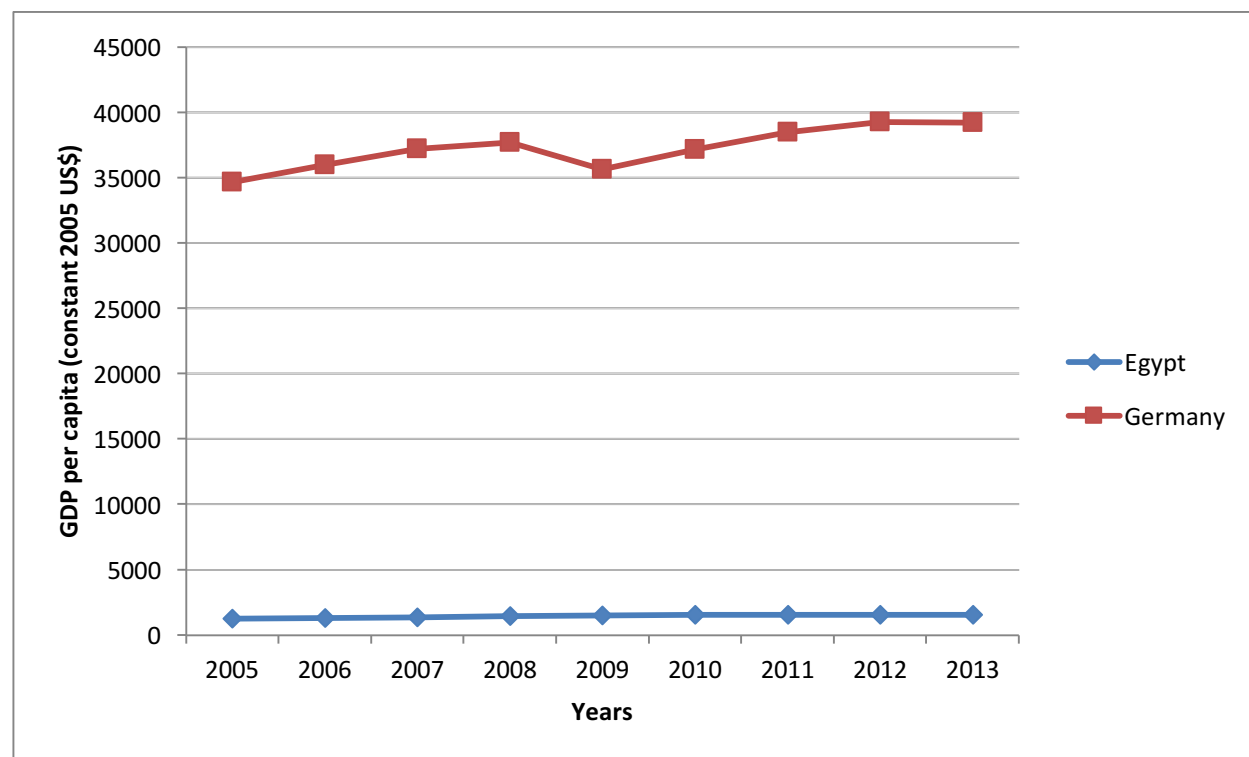
On the other hand and according to the World GDP ranking of 2015, Germany ranks the third largest by nominal GDP. This is unsurprising because according to the World Bank, Germany has been one of the leading developed economies not just in Europe but in the whole world too. It is the richest, most industrialized and populous country in the Eurozone and the second richest in the world after the United States. Germany rebounded and quickly caught up economically after World War II to become the region's economic giant. Despite the financial crisis of 2008/2009, which caused the worst recession since 1949, the country was able to pull through

more strongly than other Eurozone countries by the help of its export industries. Post World War II, Germany's economic growth has continued to rise, unemployment rates fell and finally Germany was able to retain its position as one of the world's most developed and efficient industrial nations.

The economic performance of the German economy helped in keeping unemployment rates low and economic development high. This greatly affected women's position in the German labor market. According to Brenke (2015), women's labor force participation has increased by ten percentage points since 1995, while only a one percentage point for their male counterparts. This was explained by higher educational attainment of women, the development and changes in the economic structure of the economy. Furthermore, the Global Gender Gap Report (2013) ranks Germany 46<sup>th</sup> out of 136 countries in terms of economic participation and opportunity.

### 2.4.3 World Development Indicators: Germany versus Egypt

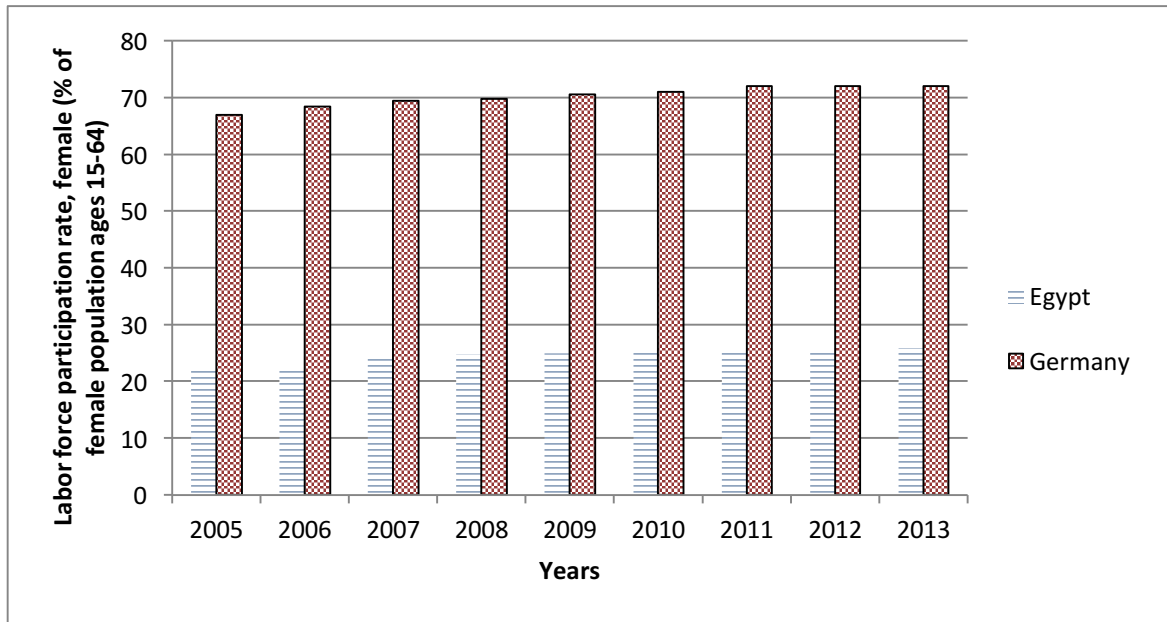
Figure 2: Real GDP per Capita US\$ in Germany and Egypt 2005-2013



Source: World Bank – World Development Indicators

Figure 2 shows how big the gap between the German and the Egyptian real GDP is, which tells how different the economic growth and performance of Germany is as compared to Egypt.

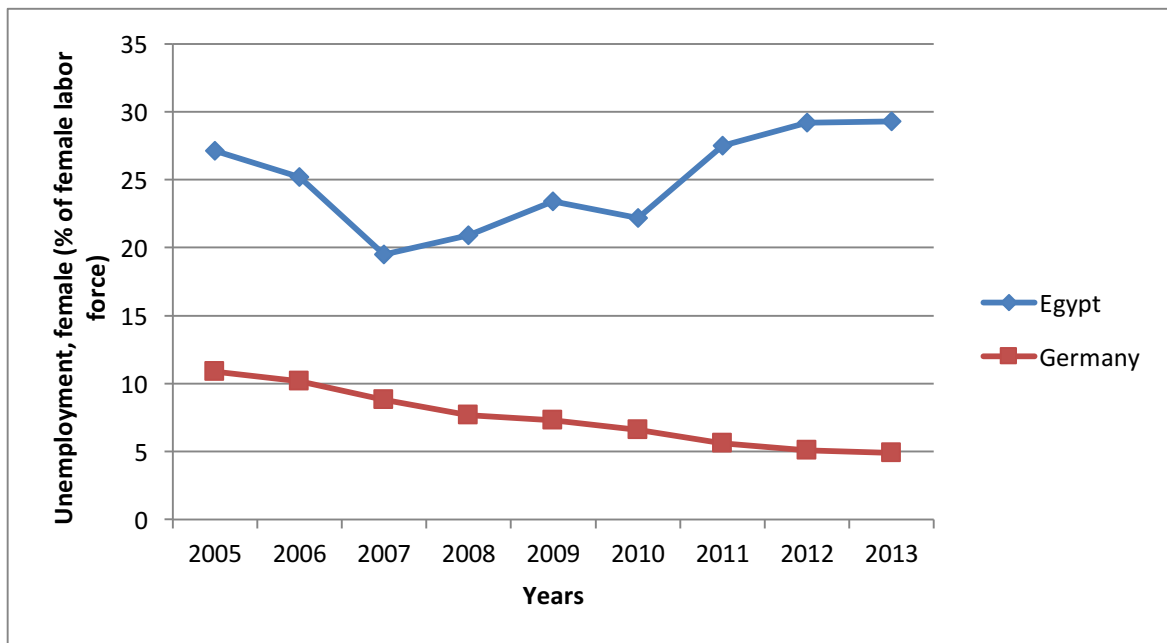
Figure 3: Female Labor Force Participation in Germany and Egypt 2005-2013



Source: World Bank – World Development Indicators

Figure 3 shows that the Egyptian FLFPR has been less than half of that of the German FLFPR between 2005 and 2013.

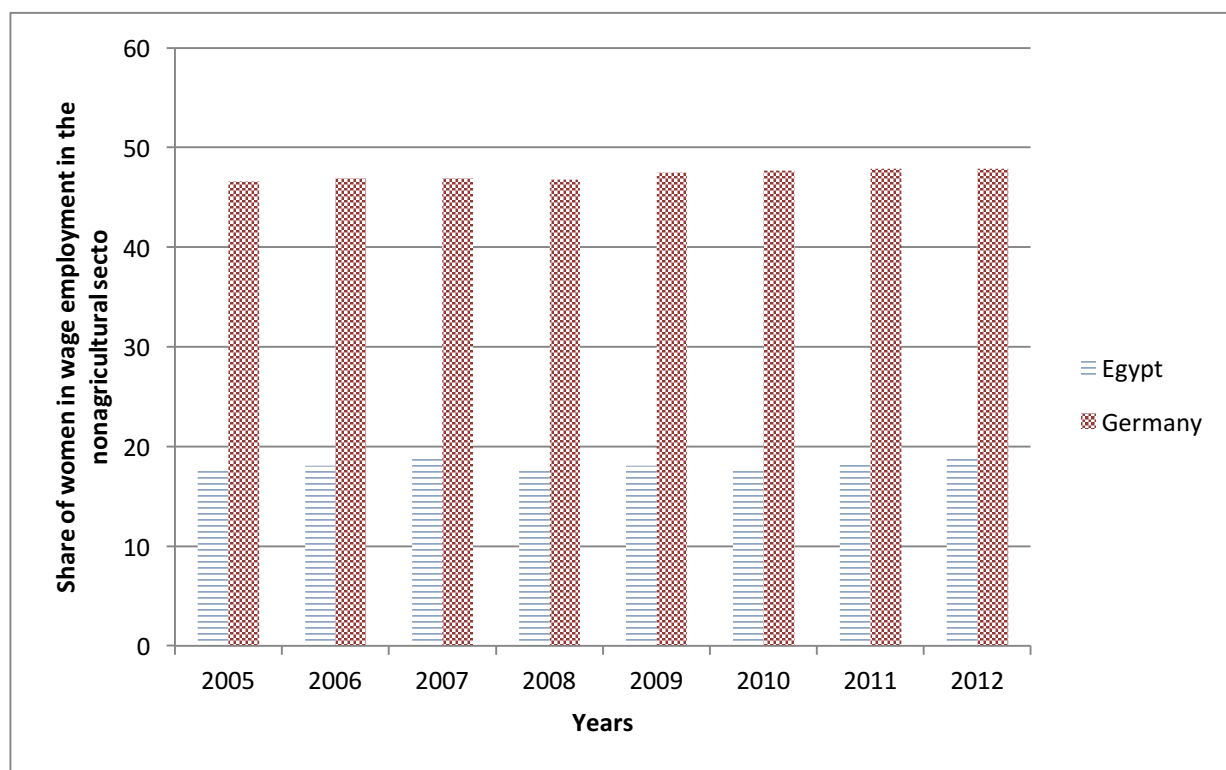
Figure 4: Female Unemployment Rate in Germany and Egypt 2005-2013



Source: World Bank – World Development Indicators

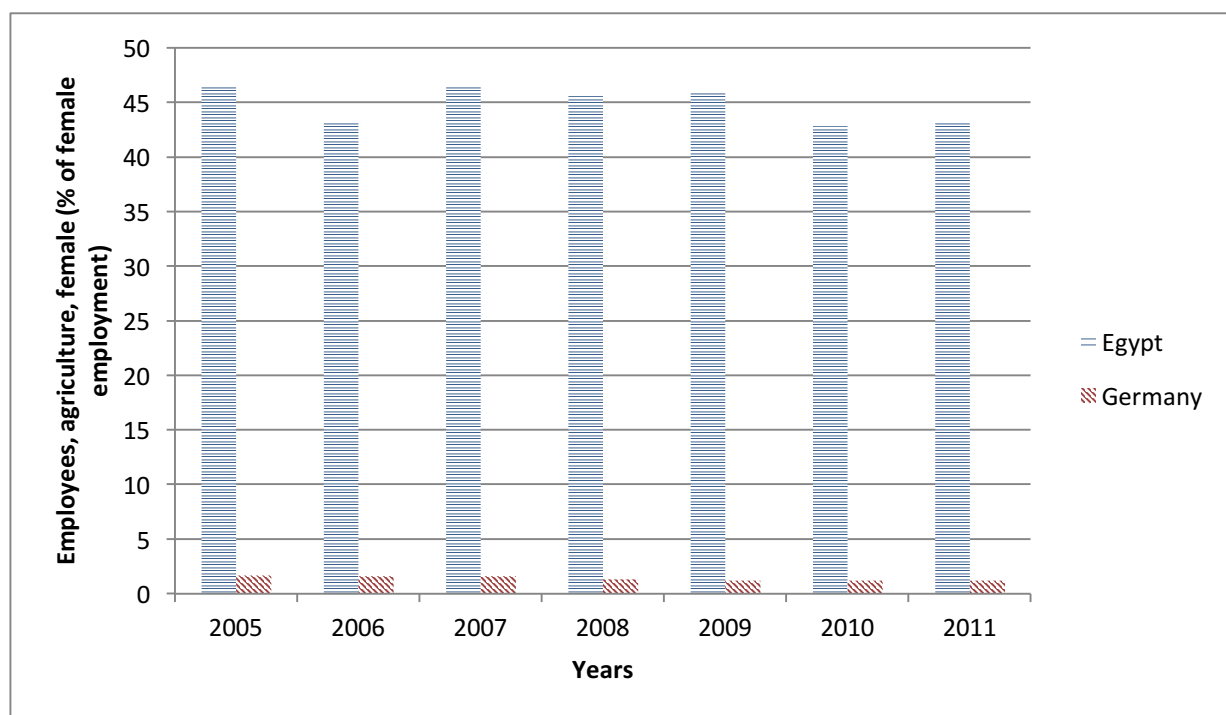
Figure 4 shows that the Egyptian female unemployment rate has been gradually growing post the January 2011 revolution, while the German female unemployment rate has been falling since 2005.

Figure 5: Share of women employed in the nonagricultural sector in Germany and Egypt 2005-2012 (% of total nonagricultural employment)



Source: World Bank – World Development Indicators

Figure 6: Female employees in agricultural sector in Germany and Egypt 2005-2011 (% of female employment)



Source: World Bank – World Development Indicators



Figures 1 through figure 6 indicate the discrepancies in world development indicators between Germany and Egypt. Such differences may in a way or another explain why there is such a big difference in FLFPR between both countries, yet those indicators cannot fully explain such difference because women's participation in labor market is affected by a huge number of factors that have not been illustrated in the above mentioned figures.

For example and as illustrated by the real GDP figure above, since 2005 – 2013 Germany's real GDP has been higher than that of Egypt's. This in itself illustrates that the economic growth and development of Germany is much higher than that of Egypt's. Which somehow explains why Germany is considered to be an industrialized, developed country whereas Egypt is still considered a developing country (at the primary stages of industrialization). Developing countries are commonly known for their low level of female participation as compared to other developed countries, which somehow explains the big gap between the German FLFPR and the Egyptian FLFPR.

Exploring the reasons behind such low FLFP in Egypt as compared to Germany's FLFP is of great importance because if FLFP is not well promoted then this would mean a significant underutilization of Egypt's human capital resources, which will hinder the economic performance and development of the Egyptian economy in the long run. Moreover, if particular factors were found to enhance and encourage FLFP whether in Germany or Egypt, this would aid policy makers plan on how to target such factors so as to boost women's participation in the labor market and at the same point reduce the probability of women leaving the labor market.

### **3. Empirical Approach and Data**

Based on the particular objectives being addressed in this thesis, a specific methodology is applied. The first objective is to examine the effect of education on Egyptian FLFP while considering other personal and household factors. The second objective is concerned with pinpointing if and how education and other personal and household factors affect the Egyptian FLFP as compared to the German FLFP.

The major interest here was to identify what factors explain women's decision to participate or not participate in Egyptian and German labor markets.

Consequently, the research questions that this study aims to answer are:

1-What is the effect of educational attainment and other personal and household factors on Egyptian FLFP?

2-Is the relationship between personal and household factors and FLFP notably different in Egypt than Germany?

#### **3.1 Data Description**

For the given objectives and research questions, the dependent variable "FLFP" of each structural model was not directly observed. Therefore, a quantitative method of testing; limited dependent variable technique; Probit model was utilized in both models. The cross sectional analysis is conducted through the use of the 2012 Egyptian Labor Market Panel Survey (ELMPS) by Economic Research Forum Datasets in collaboration with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) and the 2012 German Socio-Economic Panel (SOEP). Considering the given objectives, two main filters were applied for both models. For the specified scope of the study only females were included in the samples. Age for respondents ranged from 15-64 to reflect working age group as defined by World Bank.

The data on the Egyptian labor market was obtained from the Egyptian Labor Market Panel Survey (ELMPS) of 2012. The nation-wide surveys sampled a large number of households across governorates of Egypt allowing for a comprehensive image of the labor market. It provides information regarding the Egyptian labor market conditions, work opportunities, as well as other indicators such as household structure, education, and health. The 2012 round of the surveys – the most recent year for which data is

available – presents an extraordinary opportunity to explore the impact of recent events on the Egyptian labor market and economy. The panel follows a nationally representative sample of 12,060 households in 2012 – divided as follows; 6,752 households visited in 2006, 3,308 households that split from the original sample, and 2,000 new households – and 49,186 individuals. The survey contains a large number of socio-demographic variables, and household data, thereby allowing for the estimation of female labor force participation functions (Assaad and Krafft 2013).

The data on the German labor market was obtained from the German Socio-Economic Panel (SOEP) of 2012. SOEP is a wide-ranging illustrative longitudinal study of private households, located at the German Institute for Economic Research, DIW Berlin. Each year, nearly 11,000 households, and about 30,000 persons were sampled by the information-gathering organization Infratest Sozialforschung (TNS). The data provide information on all household members, consisting of Germans living in the old and new German states, foreigners, and recent immigrants. The panel started in 1984 and is now considered to be a multidisciplinary household panel study covering a wide variety of social and behavioral sciences: economics, psychology, sociology, econometrics, educational science, public health, political science, demography, geography, behavioral genetics, and sport science, thereby well serving the thesis and allowing for the estimation of female labor force participation functions (Wagner, Frick and Schupp 2007).

A description of the dependent and explanatory variables used in each model is provided in Table 2 and Table 3 and after which the models are presented.

### 3.2 Variables Description and Model Estimation: Egyptian Model

Table 2: Variables Description in the Econometric Model – Egyptian Model (1) and (2)

Variables	Description
<b>Dependent Variable</b>	
<b>Female Labor Force Participation (<math>FLFP_E</math>)</b>	Captures if the $i$ th women is participating or not participating in the Egyptian labor market =1 if women is working or currently searching for a job or working and currently searching for a job =0 otherwise
<b>Independent Variables</b>	
<b><i>Educational Attainment (EA)</i></b>	Represents women's highest level of education attained With reference to being illiterate, is she literate without any diploma, went to elementary school, middle school, general high school, vocational high school, post-secondary school or university and above. Each category is considered a dummy variable on its own.
<b>Other Personal Factors (PF)</b>	
<b><i>Age</i></b>	Age of the female respondent. Ranges from 15–64 years
<b><i>Age<sup>2</sup></i></b>	Age of the female respondent squared to account for non-linearity
<b><i>Marital</i></b>	Women's marital status With reference to being single, is she married, divorced or widowed. Each category is considered a dummy variable on its own.
<b><i>Residency</i></b>	Women's Residency: to account for systematic differences in income between urban and rural areas =1 if lives in a rural area =0 if lives in an urban area
<b><i>Ever Worked</i></b>	Has the women ever worked or not =1 if the respondent worked before =0 otherwise
<b><i>Presence of Children</i></b>	Captures whether the female respondent has children or not =1 if the respondent has one or more children =0 if the respondent has no children

<b>Variables</b>	<b>Description</b>
<b>Household Factors (HHF)</b>	
<i>Father Educated</i>	The respondent's father educational status =1 if the respondent's father has a school or university certificate =0 if the respondent's father is illiterate or reads and writes only
<i>Mother Educated</i>	The respondent's Mother educational status =1 if the respondent's mother has a school or university certificate =0 if the respondent's mother is illiterate or reads and writes only
<i>Father Employed</i>	The respondent's father employed or not =1 if the respondent's father is a wage worker, employer, self-employed or unpaid family worker =0 if the respondent's father has no job
<i>Mother Employed</i>	The respondent's mother employed or not =1 if the respondent's mother is a wage worker, employer, self-employed or unpaid family worker =0 if the respondent's mother has no job
<i>Has Help</i>	Anyone hired to help with cooking or cleaning at home =1 if the respondent has someone to help her at home =0 otherwise
<i>Wealth Index<sup>1</sup></i>	Women's wealth index based on several holding assets A standardized wealth scalar variable that ranges from -2.65–4.16

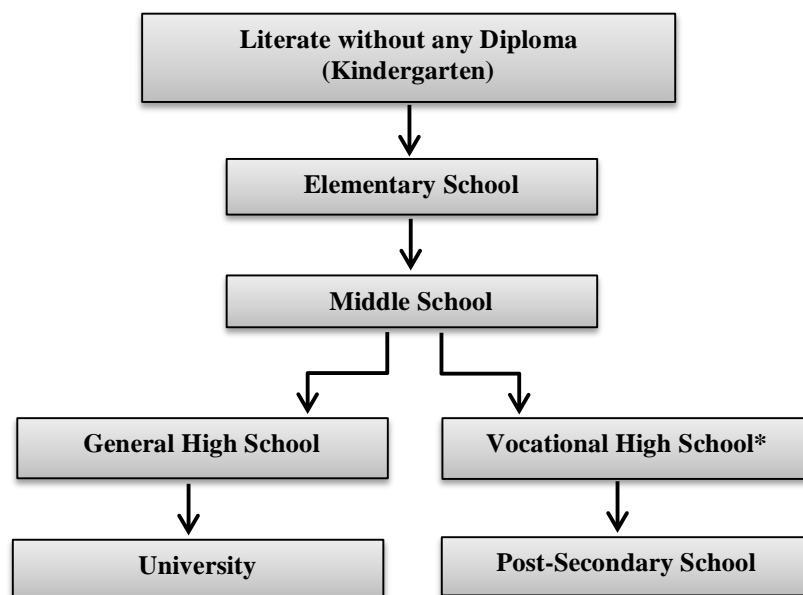
<sup>1</sup> Obtained from ELMPS (2012)

Before we analyze the model targeting the first research question, what is the effect of educational attainment and other personal and household factors on Egyptian FLFP? Certain points should be noted:

1- The dependent variable  $FLFP_E$  is based on the extended definition of female labor force participation which consists of everyone who is involved in the production and processing of primary products, whether for their personal consumption or to sell in markets or use for the exchange of other goods as in barter system. This is particularly important for women in Egypt because many women engage in animal husbandry and the processing of dairy products for household consumption (Assad and Krafft 2013).

2- The explanatory variable: educational Attainment was used to capture how different educational attainment levels affect FLFP. It follows the Egyptian educational system as shown in the below figure.

Figure 7: Educational System in Egypt



\*Vocational high school is provided at separate schools following which students may move to vocational centers or enter the job market immediately. If students are to be awarded a Diploma, they should then enter a post-secondary school.

Source: Author's illustration based on the literature

### *Egyptian General Model*

$$FLFP_E = \mathcal{F}(EA, PF, HHF) \quad (1)$$

### *Egyptian Specific Model*

$$FLFP_{E_i} = \alpha + \beta EA_i + \delta PF_i + \gamma HHF_i + \varepsilon \quad (2)$$

As illustrated by the general and specific equations above, Egyptian FLFP ( $FLFP_E$ ) is a function of the female's educational attainment, personal factors and household factors as specified in Table 2.

$EA$  is the vector for educational attainment levels

$PF$  is a vector of variables pertaining to other female-specific characteristics

$HHF$  is a vector of variables pertaining to household-level characteristics

$\alpha$  is the constant term representing the predicted probability of participating for a female if all personal and household factors are evaluated at zero

$\beta, \delta$  and  $\gamma$  are the coefficient vectors measuring the effects of EA, PF and HHF respectively on  $FLFP_E$

$\varepsilon$  is the residual term representing the difference between the estimated FLFP and the observed FLFP and which should not be correlated with all other independent variables included in the model.

$i$  is representative of the number of individuals in the sample, running from 1 to N, where N is the sample size.

### 3.3 Variables Description and Model Estimation: Comparative Model

Table 3: Variables Description in the Econometric Model – Comparative Model (3) and (4)

Variables	Description
<b>Dependent Variable</b>	
<b>Female Labor Force Participation (<math>FLFP_C</math>)</b>	Captures if the $i$ th women is participating or not participating in the Egyptian or German labor market =1 if women is working or currently searching for a job or working and currently searching for a job =0 otherwise
<b>Independent Variables</b>	
<b><i>Years of schooling (YSCHL)</i></b>	Women’s highest level of education in years. Ranges from 7–18 years
<b>Other Personal Factors (PF)</b>	
<b><i>Age</i></b>	Age of the respondent. Ranges from 15–64
<b><i>Age<sup>2</sup></i></b>	Age of the respondent squared. Allowing for non-linearity
<b><i>Marital Status</i></b>	Women’s marital status With reference to being single, is she married, divorced or widowed. Each category is considered a dummy variable on its own.
<b><i>Residence</i></b>	Women’s Residence; urban or rural =1 if lives in a rural area =0 if lives in an urban area
<b><i>Number of Children</i></b>	Number of children each respondent has. Ranges from 0 to 4+
<b>Household Factors (HHF)</b>	
<b><i>Relation to Household</i></b>	Women’s relation to household With reference to being a spouse, is she a daughter or the head of the family. Each category is considered a dummy variable on its own.
<b><i>Household Size</i></b>	The size of the household where the women lives. Ranges from 1 to 6+
<b><i>Wealth</i></b>	Captures women’s wealth. A wealth scalar that ranges from 0 to 3 0 represents no wealth and 3 represents the highest wealth possible



Before we analyze the model targeting the second research question, Is the relationship between personal and household factors and FLFP notably different in Egypt than Germany? And for the comparative study considerations, certain points should be noted:-

1-The dependent variable  $FLFP_c$  is based on the market definition of female labor force participation which consists of everyone who is either engaged in economic activity for the purposes of market exchange or who is seeking such work. Under the market labor force definition women engaged in the production and processing of primary products, whether for their personal consumption or to sell in markets or use for the exchange of other goods as in barter system are not considered to be employed or in the market labor force (Assad and Krafft 2013).

Due to data limitations, the market definition rather than the extended definition of FLFP is used in the comparative study. Specifically because there was no information regarding unpaid family workers in the German Socio-economic Panel Data (SOEP). Therefore, unpaid family workers in the Egyptian Data (ELMPS) were excluded.

2-The explanatory variable: years of schooling is considered to capture each woman's highest level of education in years and is used instead of the educational attainment levels because of the difference in educational system between Egypt and Germany.

3-The explanatory variable: wealth is a computed scalar variable considering only two assets holding; ownership of dwelling and ownership of a car. Those two assets were specifically chosen for that they capture the main holding assets of most respondents.

### *Comparative General Model*

$$FLFP_C = \mathcal{F}(YSCHL, PF, HHF) \quad (3)$$

### *Comparative Specific Model (Base line Model)*

$$FLFP_{C_i} = \alpha + \mu YSCHL_i + \rho PF_i + \sigma HHF_i + \varepsilon \quad (4)$$

As illustrated by the general and specific equations above, Comparative FLFP ( $FLFP_C$ ) is a function of the female's educational attainment, personal factors and household factors as specified in Table 3.

$YSCHL$  is the variable pertaining to the female's highest level of education in years

$PF$  is a vector of variables pertaining to other female-specific characteristics

$HHF$  is a vector of variables pertaining to household-level characteristics.

$\alpha$  is the constant term representing the predicted probability of participating for a female if all personal and household factors are evaluated at zero.

$\mu$  is the coefficient measuring the effect of an additional year of schooling on  $FLFP_C$ .

$\rho$  and  $\sigma$  are the coefficient vectors measuring the effects of  $PF$  and  $HHF$  on  $FLFP_C$ .

$\varepsilon$  is the residual term representing the difference between the estimated FLFP and the observed FLFP and which should not be correlated with all other independent variables included in the model.

$i$  is representative of the number of individuals in the sample, running from 1 to  $N$ , where  $N$  is the sample size.

## 4. Empirical Results

### 4.1 Empirical Results: Egyptian Model

While other academic articles showed that the higher the female's educational attainment the higher her tendency to search for a job or work explained by the rationale that the more educated individuals are, the greater their income potential because education increases the opportunities for paid employment, the question still remains if such causal relationship always exists, given that two case studies undertaken in Pakistan and Egypt showed surprisingly different results. This brings us to the following section, which actually examines if higher education leads to higher FLFP or not. In addition to explaining how certain personal and household factors affect the Egyptian FLFP.

Table 4: Descriptive Statistics for Egyptian Data - 2012

	<b>Proportions/Means</b>
<b><u>Dependent Variable</u></b>	
<b><i>Female Labor Force Participation</i></b>	
Participating	0.35
Not Participating	0.65
<b><u>Independent Variables</u></b>	
<b><i>Educational Attainment</i></b>	
Illiterate	0.30
Literate without any diploma	0.03
Elementary school	0.08
Middle school	0.10
General high school	0.06
Vocational high school	0.26
Post-secondary school	0.03
University and above	0.14
<b><i>Age</i></b>	34.11
<b><i>Age<sup>2</sup></i></b>	1332.52
<b><i>Marital Status</i></b>	
Single	0.20
Married	0.72
Divorced	0.02
Widowed	0.06
<b><i>Residence</i></b>	
Urban	0.47
Rural	0.53
<b><i>Ever Worked</i></b>	0.26
<b><i>Presence of Children</i></b>	0.55
<b><i>Father Educated</i></b>	0.31
<b><i>Mother Educated</i></b>	0.19
<b><i>Father Employed</i></b>	0.97
<b><i>Mother Employed</i></b>	0.14
<b><i>Has Help</i></b>	0.02
<b><i>Wealth</i></b>	0.02
<b>N</b>	13,414

As shown in Table 4, 65 percent of the 13,414 women in the Egyptian sample are not participating in the labor market, while only 35 percent are currently in the labor force. Before we dig deeper into finding reasonable explanations for such low participation and examining how certain factors affect FLFP, it is important to note certain demographic factors concerning the sample used. Concerning personal factors; educational attainment, the majority of females either stay illiterate or go for vocational high school. The mean age is 34 years and most of them are married and live in rural areas. In addition, 26 percent have worked before. Concerning household factors; 55 percent of females have children and two percent have someone to serve or help at home. The majority of females have uneducated parents and working fathers but not working mothers. The mean wealth score is 0.02, which illustrates that on average the number of household assets owned by a female in this sample are considered more than the average household assets owned by females in Egypt.

While there is no question that the majority of females are not participating in the Egyptian labor market, what is unclear still is if this has to do with the female's educational attainment, other personal and household factors. To investigate how such factors affect the Egyptian FLFP, the *Egyptian Specific Model* (2) is used.

Table 5: Marginal Effects from the Probit Model Predicting Female Labor Force Participation in Egypt - 2012

	<b>Marginal Coefficients (Std. Err.)</b>	
<b><i>Educational Attainment (ref. group: Illiterate)</i></b>		
Literate without any diploma	-0.06*	(0.03)
Elementary school	-0.04	(0.02)
Middle school	-0.07*	(0.02)
General high school	-0.11*	(0.02)
Vocational high school	0.11*	(0.01)
Post- secondary school	0.14*	(0.03)
University and above	0.28*	(0.02)
<b><i>Age</i></b>	0.04*	(0.00)
<b><i>Age<sup>2</sup></i></b>	-0.00*	(0.00)
<b><i>Marital Status (ref. group: Single)</i></b>		
Married	-0.11*	(0.02)
Divorced	-0.08*	(0.03)
Widowed	-0.14*	(0.02)
<b><i>Residence (ref. group: Rural)</i></b>		
Urban	-0.20*	(0.01)
<b><i>Ever Worked</i></b>	0.56*	(0.00)
<b><i>Presence of Children</i></b>	-0.03	(0.02)
<b><i>Father Educated</i></b>	-0.04*	(0.01)
<b><i>Mother Educated</i></b>	-0.02	(0.02)
<b><i>Father Employed</i></b>	-0.02	(0.03)
<b><i>Mother Employed</i></b>	0.06*	(0.02)
<b><i>Has Help</i></b>	-0.15*	(0.03)
<b><i>Wealth</i></b>	-0.01	(0.00)
<b><i>Constant</i></b>	0.32*	(0.00)
<b><i>n</i></b>	13,414	

\* Is statistically significant at a p value  $\leq 0.05$

Source: Author's calculations

Data Source: Egypt; ELMPS (2012)

Marginal coefficients were calculated in order to capture the direction and magnitude effect of each explanatory variable on the predicted probability of female participation.

Significance of each explanatory variable is based on the probit test statistic, which follows a normal distribution.

Table 5 illustrates that all levels of educational attainment significantly affect FLFP except elementary school. In reference to being illiterate, a female that just reads and writes, being in middle school or general high school has a lower predicted probability of participation in the labor market yet; a female in vocational high school, post-secondary school or university and above has a higher predicted probability of entering the market and participating. Actually the model shows that the higher the female's educational attainment (post general high school or vocational high school or higher) the higher the female's predicted probability of participating in the Egyptian labor market.

To better illustrate the marginal effect of each level of educational attainment for an average female on her FLFP, the same *Egyptian Specific Model* (2) is used to estimate the predicted probability of participating in the Egyptian labor market at each educational attainment level, while holding all explanatory variables except education at their means.

Figure 8: Predicted Probability of Participating for an Average Egyptian Female by Educational Attainment

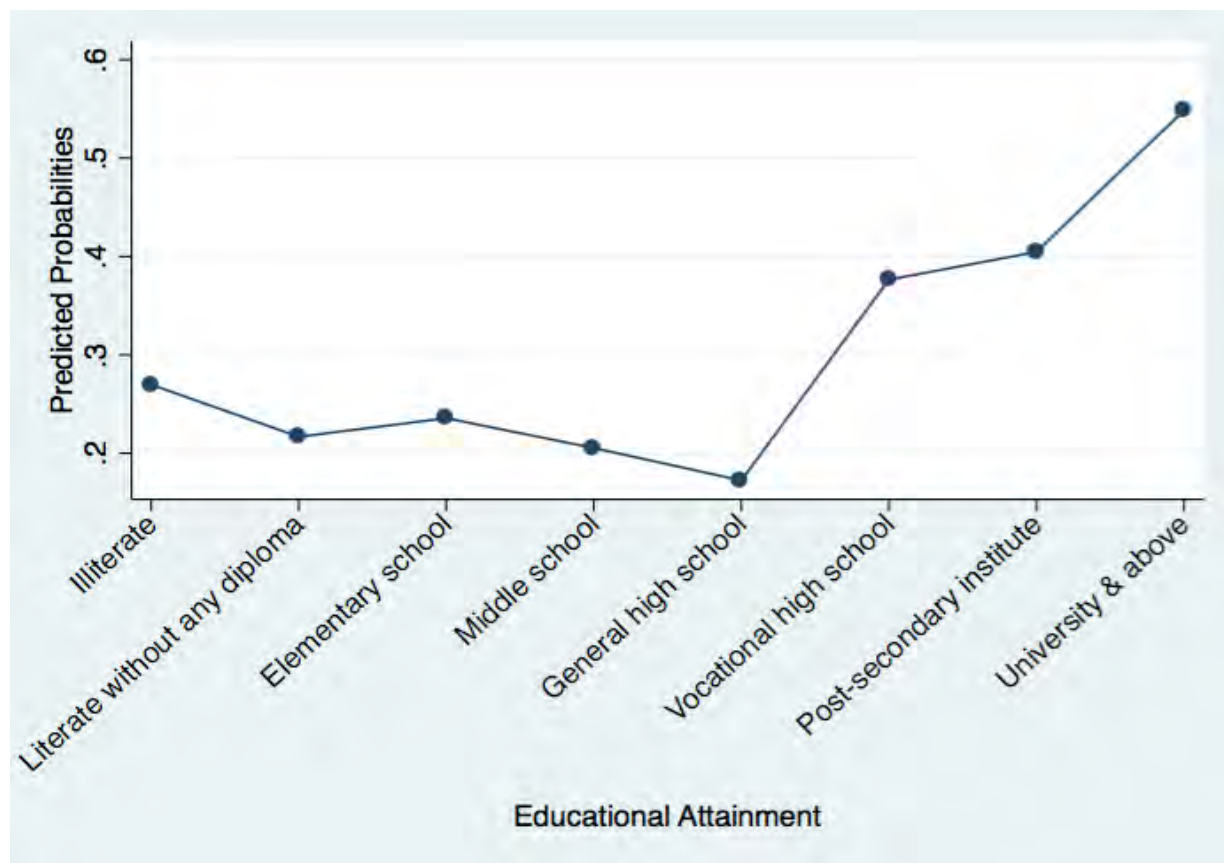


Figure 8- the difference between each predicted probability of each educational attainment level and the predicted probability of the reference group (illiterate) is nothing but the marginal coefficients illustrated in Table 5. Applying this to figure 8. Predicted Probability illiterate = 27% while predicted probability university and above = 55%  
The difference is = 55% - 27% = + 28%, which is the marginal coefficient shown in table 5 for University and above.

Figure 8 shows that educational attainment is likely to be curvilinearly related with FLFP. That is, the predicted probability of participating in the labor market is lower among women with medium levels of education (read and write, in elementary, middle or general high school), but higher among women with high levels of education (post general high school education or vocational high school) and with low levels of education (illiterate).

While according to the literature higher educational attainment levels are said to increase women's probability of joining the labor market, this is at odds with the coefficients shown in Table 5 because illiterate Egyptian women have a higher probability to join the labor market compared to those who have got educated up till general high school. The reason for such an effect on the Egyptian FLFP might be explained through two main rationales:-

- 1- The dependent variable  $FLFP_E$  used in the *Egyptian Specific Model* (2), considers women engaged in animal husbandry and the processing of dairy products for household consumption (unpaid workers) as market participants. Knowing that such work does not necessarily require females to get any type of education might explain why illiterate females have a higher predicted probability of participating than those females at early stages of educational attainment levels.
- 2- From a time constraint point of view, Egyptian women enrolled in schools do not have the time to work in parallel with education. Once they consider getting an educational degree, they devote their time mainly to education (attaining higher educational levels). On the other hand, illiterate women are not usually time constrained with something (at least education) so they would then devote their time to work and hence participate in the labor market.

Back to table 5 and given that higher educational attainment was found to have a positive impact on FLFP, it is important as well to test for other factors that were according to other academic articles and theories of great importance in predicting FLFP. As illustrated by the marginal coefficients in table 5, an additional unit change in age increases the predicted probability of female participation. In reference to being single, all other marital status categories lower the female's predicted probability of participating especially if she is a widow. In addition, living in an urban area or being a mother significantly decreases FLFP. If the women worked before this

increases her predicted probability of participating in the labor market. If the father is educated then this decreases his daughter’s probability of participating in the market. In contrast, if the female’s mother is employed this positively affects her probability of being employed as well. If there is some sort of help offered at home to serve the female, this reduces her likelihood to participate in the labor force. Wealth does not significantly affect the female’s probability of participating in the labor market.

### **Hypothetical Examples: Egyptian Single Model**

To better demonstrate how educational attainment along with marital status (figure 9) and how educational attainment along with residency (figure 10) affect the Egyptian FLFP. While assuming that 2012 patterns still hold in the future, a hypothetical example will be used for a female of “Generation Y”, specifically born in 1991. Certain predicted probabilities were estimated using her profile. The profiles are shown in the Hypothetical Example 1 and 2 below.

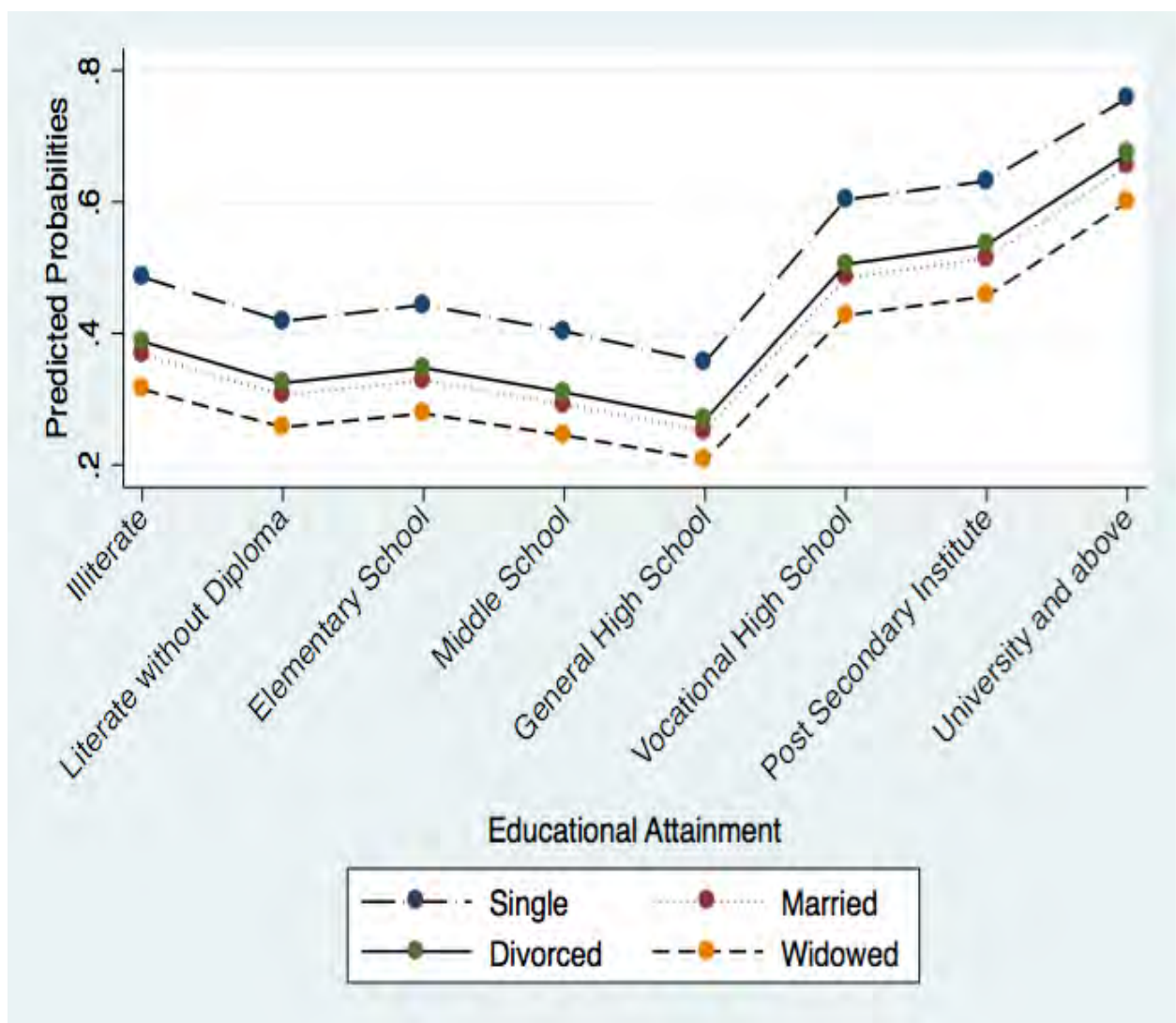
#### **Hypothetical Example (1): Effect of education and marital status on Egyptian FLFP**

<b>Explanatory Variables</b>	<b>Hypothetical Profile</b>
<i>Education</i>	<b>Varying</b>
<i>Age</i>	23
<i>Age<sup>2</sup></i>	529
<i>Marital Status</i>	<b>Varying</b>
<i>Residence</i>	Urban
<i>Ever worked</i>	Yes
<i>Presence of Children</i>	No
<i>Father education</i>	Educated
<i>Mother education</i>	Educated Employed
<i>Father employment status</i>	Employed
<i>Mother employment status</i>	Employed
<i>Help</i>	Yes
<i>Wealth (mean)</i>	0.10422



Using the hypothetical profile illustrated in Hypothetical Example (1), figure 9 depicts how Egyptian FLFP differs with each educational attainment level and marital status for a female of the discussed profile. Firstly the figure confirms what has been concluded by the marginal coefficients in table 5 and figure 8, which is that post general high school education, increases the predicted probability of an Egyptian female to participate in the labor market. What figure 9 adds is that post general high school increases FLFP for all marital status categories, whether single, married, divorced or widowed. Secondly, single females of the specified profile at all education levels have higher predicted probability of participating in the labor market as compared any female of the same profile that is married, divorced or widowed.

Figure 9: Egyptian Female Labor Force Participation by Educational Attainment and Marital Status



The reason why single rather than any other marital status category have such an effect on the Egyptian FLFP might be explained by the rationale that Egypt as many other developing countries consider married women to be the one entirely responsible for household activities; cleaning, washing and cooking and the husband is the one responsible to work away from home for wage. That is why single women who are not involved in family or home responsibilities and are under less pressure compared to their married counterparts have a higher probability to join the Egyptian labor market.

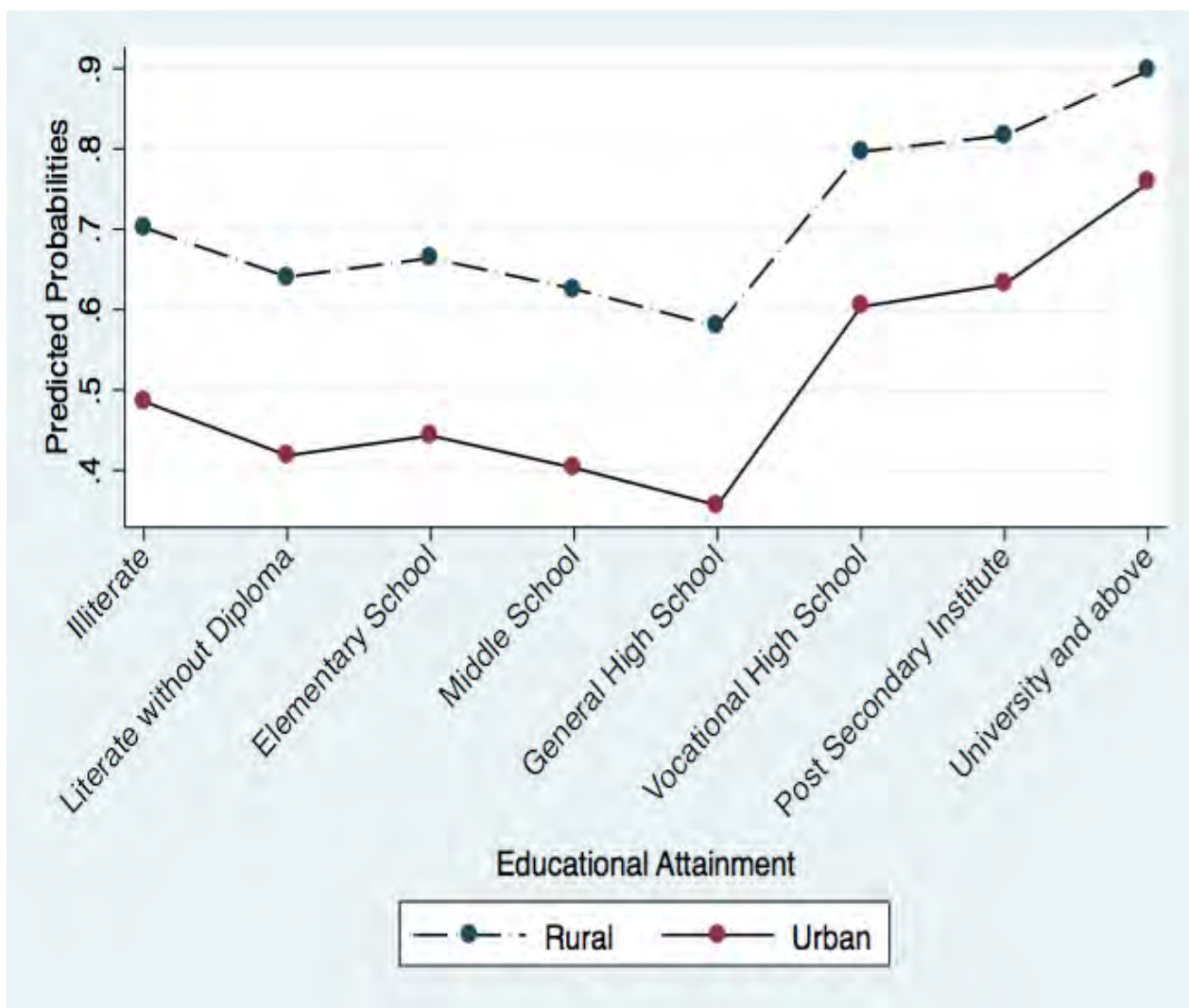
### **Hypothetical Example (2): Effect of education and area of residency on FLFP**

<b>Explanatory Variables</b>	<b>Hypothetical Profile</b>
<i>Education</i>	<b>Varying</b>
<i>Age</i>	23
<i>Age<sup>2</sup></i>	529
<i>Residence</i>	<b>Varying</b>
<i>Marital status</i>	Single
<i>Ever worked</i>	Yes
<i>Presence of Children</i>	No
<i>Father education</i>	Educated
<i>Mother education</i>	Educated Employed
<i>Father employment status</i>	Employed
<i>Mother employment status</i>	Employed
<i>Help</i>	Yes
<i>Wealth (mean)</i>	0.10422

Using the hypothetical profile illustrated in the Hypothetical Example (2), living in urban areas decreases the predicted probability of participation of an Egyptian female of the given profile by 20 percentage points at each educational attainment level.

Figure 10 portrays how Egyptian FLFP differs with each educational attainment level and females' area of residence (urban versus rural). Again the figure shows that post general high school education raises the predicted probability of an Egyptian female to participate in the labor market whether she lives in an urban or rural area. In addition, it shows that post general high school educational attainment increases FLFP for females living in rural areas higher than their counterparts who live in urban areas.

Figure 10: Egyptian Female Labor Force Participation by Educational Attainment and Residency



Normally we would expect that females that live in urban areas do participate more in the labor market as compared to their counterparts living in rural areas because according to previous literature living in urban areas allow females to get better access to education, more work choices and even more enhanced working environment as compared to rural areas. The reason why women living in rural areas have a higher marginal effect on the Egyptian FLFP might be justified by the following:-

From a rural point of view:-

- 1- Rural areas are known for being less developed than urban areas and in Egypt specifically it is natural to hypothesize that rural Egyptian women earn less income compared to urban Egyptian women. This forces rural women to participate more in the labor market and work out of necessity in order to generate income to support household expenditures in comparison to urban women. Moreover, rural men are not considered the only breadwinners, women are usually required to work and assist the family financially.
- 2- According to figure 10, highly educated rural women are expected to participate more in the Egyptian labor market as compared to highly educated urban women. This might be rationalized by the fact that few Egyptian rural women get highly educated (post general high school or vocational high school), which might be a one in a million chance. This increases the probability of such woman to join the market because of the exceptionality of being well educated and at the same time living in a rural area.

From an urban point of view:-

- 3- Despite the fact that Egyptian urban women go for higher educational attainment levels, but their participation according to figure 10 is much less compared to rural women. This might be because some urban women get educated for reasons other than getting a better job e.g. to attract a husband from a certain categorical level – Better husband rather than a better job (marriage perspective).
- 4- Sometimes even highly educated urban women decide not to participate in the Egyptian labor market because they find no good job opportunity that would fit their requirements (salary or working environment perspective).

It was clear through figure 10 that returns to education are much higher for rural women than urban women yet, Egyptian rural women do not usually get educated. This might be not be purely based on the women's choice (getting educated or not), but it might be related to the struggle that rural women face in accessing basic education because of inequalities that originate in sex, health and cultural identity (ethnic origin, language, religion) in rural areas.

## **4.2 Empirical Results: Comparative Model**

While the previous results revealed that education and other personal and household factors do affect the Egyptian female's propensity to participate in the Egyptian labor market and in specific it was concluded that post general high school and vocational high school education in fact increases FLFP in Egypt, the question still remains if the relationship between education, personal and household factors and FLFP is notably different in Egypt than the countries in the Global North which have been the focus of much of economic research and theories. Thus, we now turn to examine both Egyptian and German FLFP. Specifically the following section observes if and how certain personal and household factors affect FLFP in both countries. As mentioned in the Methodology section, the German SOEP v29 (2012) and Egyptian ELMPS (2012) were combined to allow us to examine the similarities and differences in FLFP in the two nations.

First off, the following page provides a detailed description of the sample used for the comparative study undertaken and the corresponding descriptive statistics. Following that the *Comparative Specific Model (Base line Model)* (4) will be used with certain modifications to account for certain tests made in order to reach a reasonable conclusion on if and how different factors affect Egyptian FLFP and German FLFP.

Table 6: Descriptive Statistics for Combined, West Germany, East Germany and Egypt\* - 2012

	Combined Data	West Germany	East Germany	Egypt
<b><u>Dependent Variable</u></b>				
<i>Female Labor Force Participation</i>				
Participating	0.43	0.77	0.80	0.24
Not Participating	0.57	0.23	0.20	0.76
<b><u>Independent Variables</u></b>				
<i>Years of Schooling</i>	11.05 (3.14)	12.49 (2.72)	12.86 (2.47)	10.20 (3.06)
<i>Age</i>	37.68 (13.61)	43.87 (12.19)	44.99 (12.34)	34.68 (13.61)
<i>Age<sup>2</sup></i>	1605.60 (1073.54)	2073.50 (1028.98)	2176.51 (1060.07)	1332.27 (993.06)
<i>Marital Status</i>				
Single	0.22	0.24	0.28	0.20
Divorced	0.09	0.14	0.13	0.06
Widowed	0.02	0.03	0.04	0.02
Married	0.67	0.59	0.55	0.72
<i>Residence</i>				
Urban	0.57	0.82	0.47	0.47
Rural	0.43	0.18	0.53	0.53
<i>Relation to Household</i>				
Head	0.24	0.46	0.55	0.11
Spouse	0.59	0.46	0.39	0.68
Daughter	0.17	0.08	0.06	0.21
<i>Number of Children</i>	1.07 (1.31)	0.61 (0.90)	0.49 (0.83)	1.34 (1.43)
<i>Household Size</i>	3.88 (1.89)	2.80 (1.26)	2.55 (1.13)	4.51 (1.90)
<i>Wealth</i>	1.52 (1.10)	1.94 (1.14)	1.76 (1.17)	1.32 (1.01)
<b>N</b>	20,881	5,732	1,728	13,421

\*According to Chi-Square and t Test, all Eastern German and Egyptian proportions and means indicated in the above table are statistically distinguishable from Western Germany's proportions and means.

As shown in Table 6 in the previous page, 57 percent of the 20,881 women in the combined sample are not participating in the labor market meaning that only 43 percent are currently in the labor force. Yet, when we examine the countries separately the story is more complicated. Due to the divergent historical legacies in East and West Germany, we actually examine both regions separately as well. What is evident in these descriptive statistics is that the majority of Western and Eastern German females are actually participating in the labor market. In fact, 77 percent of women in West Germany and 88 percent of women in East Germany are either working or currently searching for a job. This is in sharp contrast to Egypt where only 24 percent of Egyptian females are participating in the labor force (Recall back the definition used for FLFPc in methodology section). This seemingly simple fact is significant for our examination of FLFP in that it points a substantive difference between women's engagement in the labor market in the two countries; a difference we will explore in the remainder of this thesis.

Before we dive deeper into the various nuances between Egyptian and German FLFP, it is also important to note other distinctions between the countries' demographic factors. According to table 6, the average number of years of schooling completed by women in the combined sample is 11 years. Yet, in Germany this mean is higher with the average years of schooling being 12.49 in Western Germany and 12.86 in Eastern Germany, while in Egypt the average years of schooling completed is 10.20. The mean age is 38 years old and the average number of children is one. The majority of females in Western, Eastern Germany and Egypt are married with a 59, 55 and 75 percent respectively. Most of Western German females live in urban areas, while the majority of Eastern German and Egyptian females lives in rural areas.

While there is no question that FLFP is much higher in Germany than in Egypt, what is unclear still is if this is just due to differing demographic factors in the two countries or if the culture and policies of nations also play a role. In other words the differences seen in the female labor force could possibly be completely explained on an individual level. That is, the differences between the countries are only due to the lower levels of education and larger number of children in Egypt compared to Germany. On the other hand, these differences could also be explained in part of national policy or cultural factors.

To investigate if the difference in FLFP between Germany and Egypt is due to personal or national factors and while controlling for certain personal and household factors, the *Comparative Specific Model (Base line Model)* (4) was modified through adding a new explanatory variable “*Country*”, which is a dummy variable that takes the value of 0 if the country is Germany and 1 if the country is Egypt.

$$FLFP_{c_i} = \alpha + \kappa Country_i + \mu YSCHL_i + \rho PF_i + \sigma HHF_i + \varepsilon \quad (5)$$

Table 7: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample of Germany and Egypt - 2012

	<b>Marginal Coefficients (Std. Err.)</b>	
<i>Country (ref. group: Germany)</i>		
Egypt	-0.40*	(0.01)
<i>Years of Schooling</i>	0.05*	(0.00)
<i>Age</i>	0.08*	(0.00)
<i>Age<sup>2</sup></i>	-0.00*	(0.00)
<i>Marital Status (ref. group: Single)</i>		
Married	-0.11*	(0.02)
Divorced	-0.01	(0.02)
Widowed	-0.08*	(0.02)
<i>Urban</i>	-0.05*	(0.01)
<i>Relation to Household (ref. group: Spouse)</i>		
Head	-0.00	(0.01)
Daughter	0.00	(0.02)
<i>Number of Children</i>	-0.03*	(0.00)
<i>Household Size</i>	-0.01*	(0.00)
<i>Wealth</i>	-0.00	(0.00)
<i>Constant</i>	0.42*	(0.00)
<i>n</i>	20,881	

\* Is statistically significant with a p value  $\leq 0.05$

Source: Author's calculations

Data Source: Egypt; ELMPS (2012) and Germany; SOEP v29 (2012)

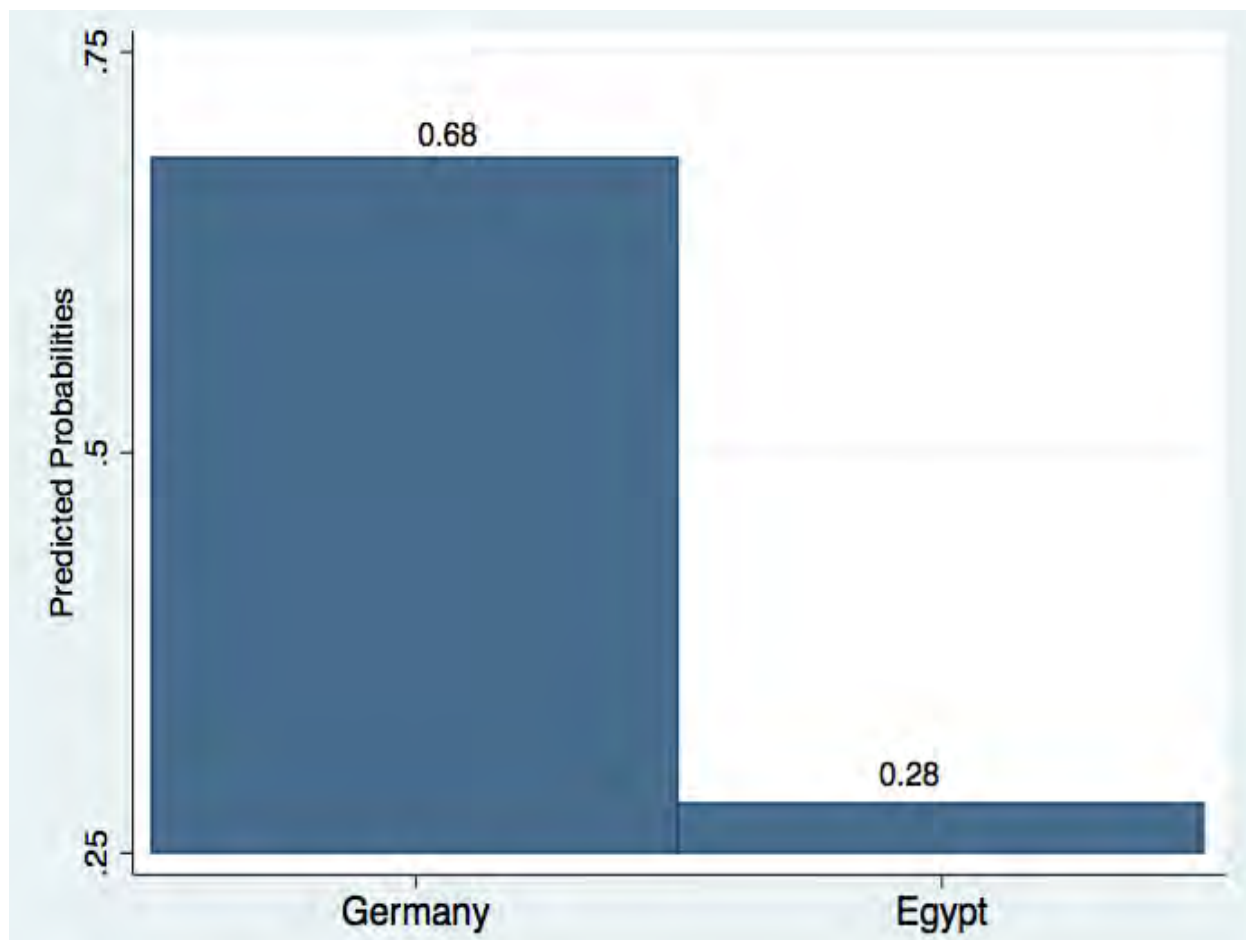
The marginal coefficients of all personal and household factors in table 7 cannot be explicitly interpreted because the combined sample is used and no differentiation between the two countries was made.



Table 7, above demonstrates that female’s nationality (German or Egyptian) actually affects her probability of participating or opting out of the labor market. That is, while years of schooling, age, marital status, living in a city, number of children, and household size all have a statistically significant relationship with FLFP they cannot (by themselves) explain the differences between the two countries. As illustrated by the marginal coefficient of Egypt and while controlling for certain personal and household characteristics, an average Egyptian female is still 40 percent less likely to work than her German counterpart. This explains that certain social values, norms, cultural diversity and the economic development of each country might also affect the willingness of females to participate in the labor market.

To further illustrate this point, consider the graph below. An average female with a German nationality has a 68 percent probability to participate in the labor market while only a 28 percent to participate if of an Egyptian nationality.

Figure 11: Predicted Probability of Participating for an Average Female by Country



The predicted probabilities calculated in figure 11 are based on factoring the country variable while holding all other explanatory variables at their means. The difference between the two predicted probabilities is the marginal coefficient of country “Egypt” in table 7.

Given the distinct historical and economical background between Western and Eastern Germany, it was important to test if Western German females' participation differs from that of Eastern German and if both actually differ from Egyptian females. The *Comparative Specific Model (Base line Model)* (4) was modified through adding a new explanatory variable "**Region**", which is a polytomous variable.

$$FLFP_{c_i} = \alpha + \nu Region_i + \mu YSCHL_i + \rho PF_i + \sigma HHF_i + \varepsilon \quad (6)$$

Table 8: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample of West/East Germany and Egypt - 2012

	<b>Marginal Coefficients (Std. Err.)</b>	
<b>Country (ref. group: West Germany)</b>		
East Germany	0.01	(0.02)
Egypt	-0.40*	(0.01)
<b>Years of Schooling</b>		
	0.05*	(0.00)
<b>Age</b>		
	0.08*	(0.00)
<b>Age<sup>2</sup></b>		
	-0.00*	(0.00)
<b>Marital Status (ref. group: Single)</b>		
Married	-0.11*	(0.02)
Divorced	-0.01	(0.02)
Widowed	-0.08*	(0.02)
<b>Urban</b>		
	-0.05*	(0.01)
<b>Relation to Household (ref. group: Spouse)</b>		
Head	-0.00	(0.01)
Daughter	0.00	(0.02)
<b>Number of Children</b>		
	-0.03*	(0.00)
<b>Household Size</b>		
	-0.01*	(0.00)
<b>Wealth</b>		
	-0.00	(0.00)
<b>Constant</b>		
	0.42*	(0.00)

\* Is statistically significant with a p value  $\leq 0.05$

Source: Author's calculations

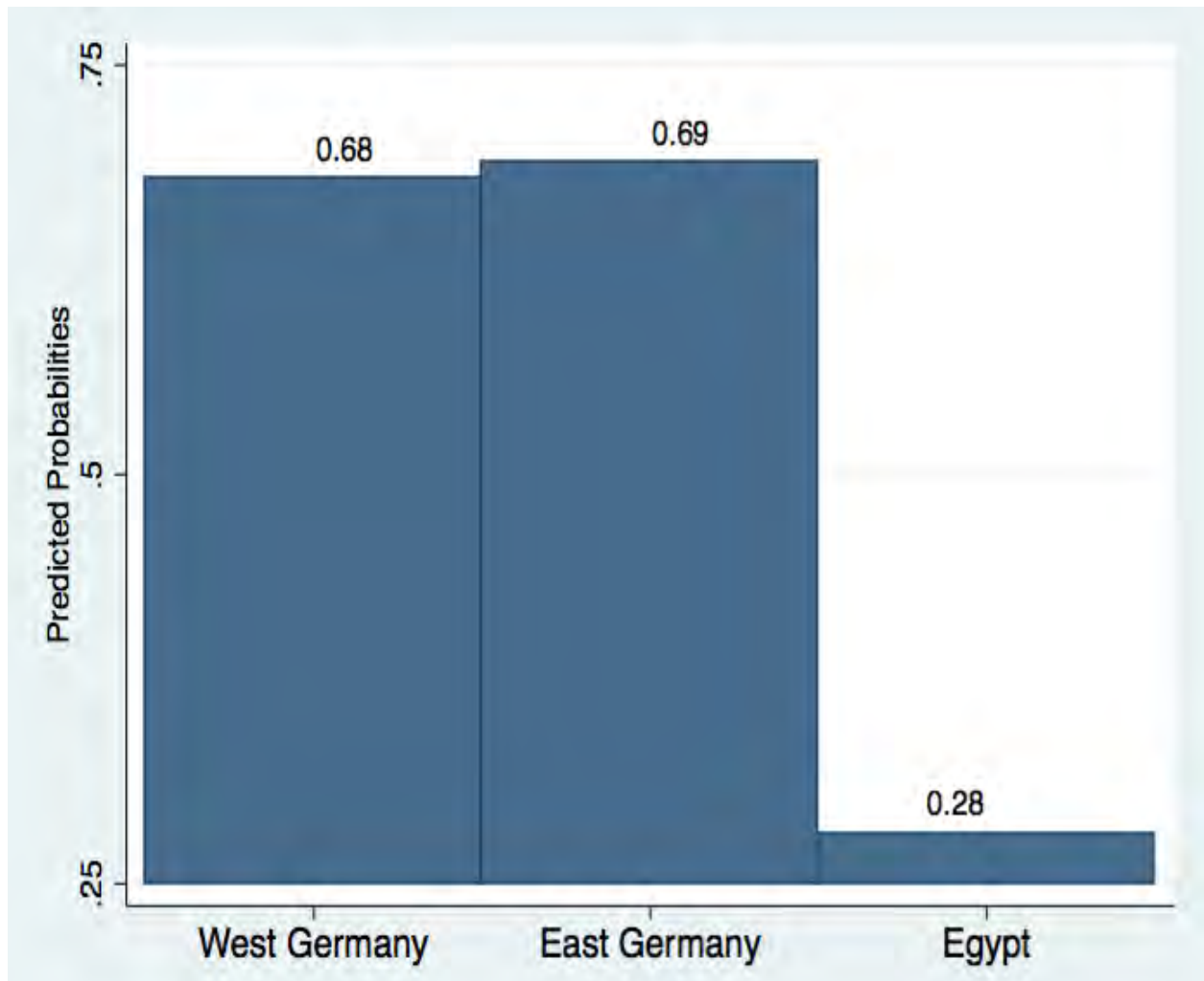
Data Source: Egypt; ELMPS (2012) and Germany; SOEP v29 (2012)

Table 8 - The marginal coefficient of being an Egyptian female is statistically distinguishable from that of an Eastern German female.

While controlling for the same personal and household factors, table 8 indicates that FLFP is not statistically distinguishable between Western and Eastern German females. On the other hand, an Egyptian female has a lower probability of participating in the labor market as compared to both Western and Eastern German females.

To further illustrate such results, the graph below shows that an average female from West or East Germany has a somehow similar predicted probability of participating in the labor market with a 68 and 69 percent respectively and has a higher predicted probability of participating as compared to an average Egyptian female who has just a 28 percent probability of participating in the Egyptian labor market.

Figure 12: Predicted Probability of Participating for an Average Female for West Germany, East Germany and Egypt



The predicted probabilities calculated in figure 12 are based on factoring the Region variable while holding all other explanatory variables at their means. The difference between each predicted probability and the West Germany's predicted probability is the marginal coefficients of each region (East Germany and Egypt) in table 8.

It is crystal clear by now that an Egyptian female has the lowest probability of participating in the labor market compared to Western and Eastern German females. This lower likelihood of participation is statistically distinguishable from both West and East Germany. What is still unclear is whether this has to do with differing demographic factors between the two countries. One of the most important demographic factors pinpointed by previous literature to be very important factor influencing FLFP. Using Years of schooling to reflect the educational level, we now move to examining how an additional year of schooling affects each of the three Region's predicted probability of participating. The merged sample for West/East Germany and Egypt was used along with an interaction term between years of schooling and each of the three nations to illustrate if education actually affects each nation's FLFP differently or not.

The *Comparative Specific Model (Base line Model)* (4) was modified through adding an interaction term between Region and YSCHL "*Region \* YSCHL*". The interaction term represents the effect of years of schooling on FLFP conditional on the value of Region (female being from West Germany, East Germany or Egypt)

$$FLFP_{C_i} = \alpha + \nu Region_i + \mu YSCHL_i + \kappa Region_i YSCHL_i + \rho PF_i + \sigma HHF_i + \varepsilon \quad (7)$$

While holding all personal and household factors at their mean, table 9 below shows that in Western Germany an additional year of schooling increases the probability of an average female's participation in the labor force by two percent. This relationship is identical for women in Eastern Germany. The marginal effect of years of schooling in Eastern Germany is not statistically distinguishable from Western Germany. In contrast, an additional year of schooling increases the probability of an average female's participation in the labor force by six percent in Egypt. This higher marginal effect of education in Egypt is statistically distinguishable from both West and East Germany.

This means that the effect of additional years of schooling on the Egyptian FLFP is threefold that of the effect on the Western and Eastern German FLFP. Which indicates that there might be a huge gain in the number of participating women in the Egyptian labor market if they would invest in higher and higher educational levels.

Table 9: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample using an interaction variable between Years of schooling and West/East Germany and Egypt.

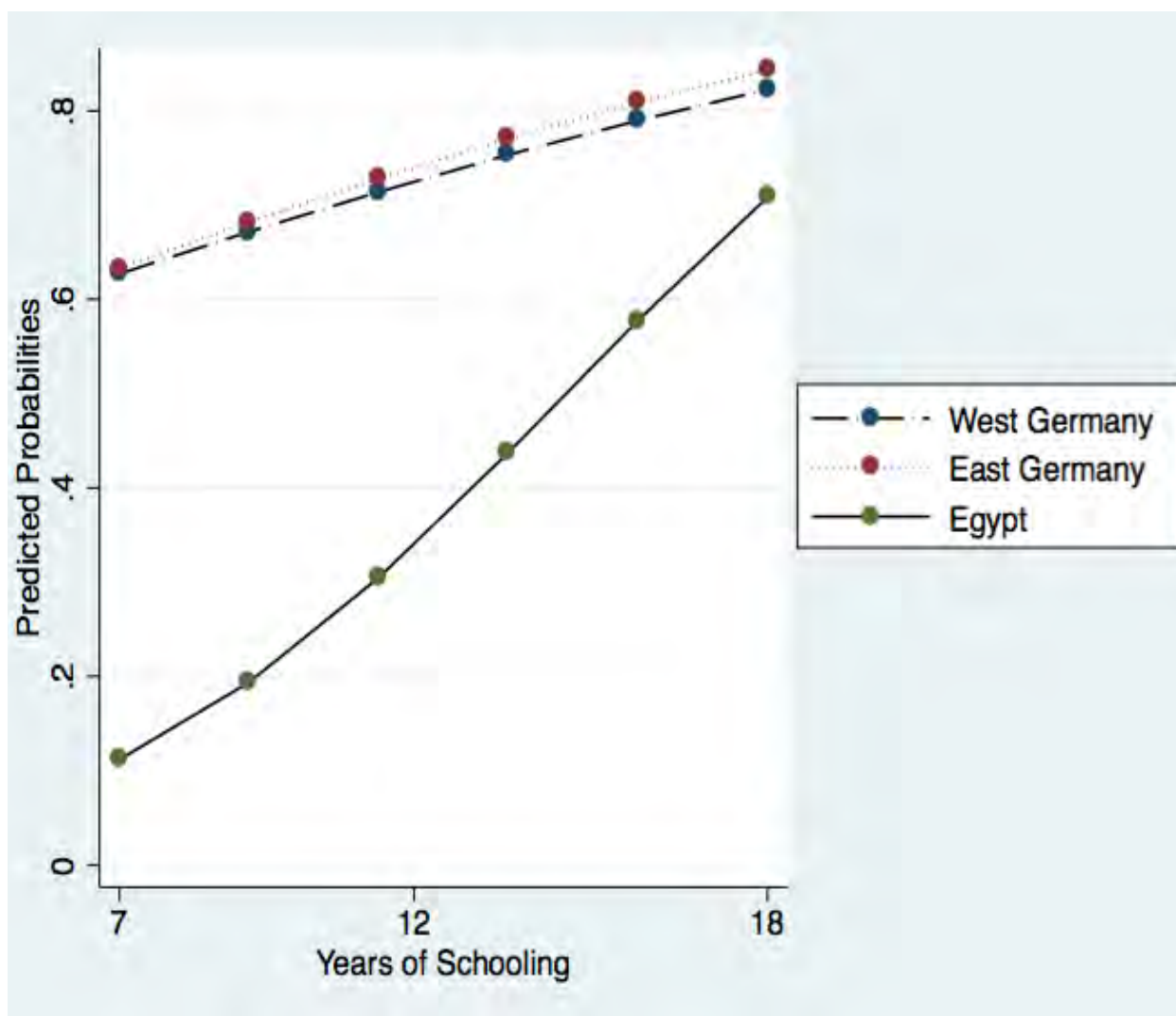
	West Germany	East Germany	Egypt
<b><i>Years of Schooling</i></b>	0.02 (0.00)*	0.02 (0.00)*	0.06 (0.00) *†
<b><i>Age</i></b>	0.08 (0.00)*		
<b><i>Age<sup>2</sup></i></b>	-0.00 (0.00)*		
<b><i>Marital Status (ref. group: Single)</i></b>			
Married	-0.13 (0.02)*		
Divorced	-0.03 (0.02)		
Widowed	-0.09 (0.02)*		
<b><i>Urban</i></b>	-0.06 (0.00)*		
<b><i>Relation to Household (ref. group: Spouse)</i></b>			
Head	0.01 (0.01)		
Daughter	-0.02 (0.02)		
<b><i>Number of Children</i></b>	-0.04 (0.00)*		
<b><i>Household Size</i></b>	-0.00 (0.00)		
<b><i>Wealth</i></b>	-0.00 (0.00)		
<b><i>Constant</i></b>	0.70 (0.01)*		

\* Is statistically significant with a p value  $\leq 0.05$

† Is statistically distinguishable from West and East Germany with a p value  $\leq 0.05$

To better illustrate the marginal effect of years of schooling for an average female on her FLFP, figure 13 portrays that while holding all personal and household factors at their means, the effect of years of schooling on Western and Eastern German females' probability of participating is always higher than on Egyptian females at each year of schooling. In contrast, it is clear that the marginal impact of years of schooling on FLFP is much higher for Egyptian females as compared to Western and Eastern German females.

Figure 13: Female Labor Force Participation while interacting years of schooling with West Germany, East Germany and Egypt



While it was clear from table 7 and table 8 that the female's nationality (German or Egyptian) affects her predicted probability of participating in the labor market differently and statistically. It was also evident that the impact of being a Western German or Eastern German female does not differently nor significantly affect the German female's predicted probability of participating in the German labor market. Given such results the comparison that follows will cover Germany and Egypt only.

Known that the impact of years of schooling on FLFP was positive and statistically distinguishable between Germany and Egypt, it is also important to test if other personal and household factors affect FLFP differently in both countries. This comparison might help in explaining why such huge difference between German and Egyptian FLFP exist.

In order to test for that the *Comparative Specific Model (Base line Model)* (4) was modified through adding an interaction term between Country and each explanatory variables; "[*Country \* (YSCHL + PF + HHF)*]". The interaction term represents the effect of each explanatory variable on FLFP conditional on the value of Country (female being from Germany or Egypt).

$$\begin{aligned}
 FLFP_{c_i} = & \alpha + \kappa Country_i + \mu YSCHL_i + \rho PF_i + \sigma HHF_i \\
 & + \kappa_1 Country_i * YSCHL_i \\
 & + \kappa_2 Country_i * PF_i \\
 & + \kappa_3 Country_i * HHF_i + \varepsilon
 \end{aligned} \tag{8}$$

Table 10, illustrates how personal factors; age, marital status and living in city and household factors; relation to household, number of children, household size and wealth affect each country's FLFP. The table as well indicates that the impact of some variables affect German FLFP significantly different from that on Egyptian FLFP.

Table 10: Marginal Effects from the Probit model predicting Female Labor Force Participation in a merged sample using an interaction variable between country and all independent variables.

	Germany	Egypt
<b><i>Years of Schooling</i></b>	0.02 (0.00)*	0.06 (0.00)* †
<b><i>Age</i></b>	0.10 (0.01)*	0.07 (0.00)* †
<b><i>Age<sup>2</sup></i></b>	-0.00 (0.00)*	-0.00 (0.00)* †
<b><i>Marital Status (ref. group: Single)</i></b>		
Married	-0.15 (0.02)*	-0.07 (0.04)*
Divorced	-0.05 (0.03)	0.00 (0.03)
Widowed	-0.18 (0.04)*	-0.04 (0.04) †
<b><i>Urban</i></b>	-0.01 (0.01)	-0.08 (0.01)* †
<b><i>Relation to Household (ref. group: Spouse)</i></b>		
Head	0.02 (0.02)	0.03 (0.02)
Daughter	0.07 (0.04)	0.00 (0.04)
<b><i>Number of Children</i></b>	-0.09 (0.01)*	-0.02 (0.00)* †
<b><i>Household Size</i></b>	-0.02 (0.01)	0.00 (0.00) †
<b><i>Wealth</i></b>	0.04 (0.01)*	-0.02 (0.00)* †
<b><i>Constant</i></b>	0.66 (0.01)*	0.27 (0.01)* †

\* Is statistically significant with a p value  $\leq 0.05$

† Is statistically distinguishable from Germany with a p value  $\leq 0.05$

Table 10 depicts that years of schooling positively affects the probability of a female whether German or Egyptian yet, it has a higher marginal impact on Egyptian females. Age as well positively affects FLFP with a higher marginal impact on German females. In reference to being single, being married decreases the female's probability of working or searching for a job in both countries. Being widowed significantly affect the German female's probability of participating in the labor market, yet does not significantly affect an Egyptian female. Living in an urban area significantly decreases the Egyptian female's probability of participating. Relation to household does not significantly affect FLFP in both countries. Number of children negatively affects the FLFP in both countries with a higher marginal impact on German females. In accordance



household size significantly affect German females but does not significantly affects Egyptian females. Wealth affects FLFP differently in the two countries. Wealth increases the probability of a female to participate in the labor market if she is of a German nationality yet, decreases such probability if she is of an Egyptian nationality.

In brief, the table below illustrates the explanatory variables that have a significant effect on both countries.

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**Significant Explanatory Variables that affect both Countries  
(Same direction, different magnitude)**

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	Effect on German FLFP	Effect on Egyptian FLFP
<b>Years of School</b>	Positive	Positive <i>Higher Marginal Effect</i>
<b>Age</b>	Positive <i>Higher Marginal Effect</i>	Positive
<b>Marital Status (Married)</b>	Negative <i>Higher Marginal Effect</i>	Negative
<b>Number of Children</b>	Negative <i>Higher Marginal Effect</i>	Negative

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**Significant Explanatory Variables that affect both Countries  
(Different direction)**

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<b>Wealth</b>	Positive	Negative
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The reason why wealth might affect the German and Egyptian FLFP differently might be because German females usually get wealthier through working (participating in the labor market). So actually the more they work, the wealthier they become (reverse causality). On the other hand, Egyptian women usually become wealthier due to household accumulated wealth. So if they are wealthy this decreases their probability of participating in the labor market.

## Hypothetical Example: Comparative Model

To better illustrate the effect of certain personal and household factors on German FLFP versus Egyptian FLFP and while assuming that 2012 patterns hold, a hypothetical example illustrating four females with different profiles will be used. Predicted probabilities were estimated using those profiles for year 2012, while considering that profile A is the baseline profile. Certain personal and household factors were assumed to vary over those profiles to indicate how the probabilities of participating would change given those variations. These profiles are shown in the table below.

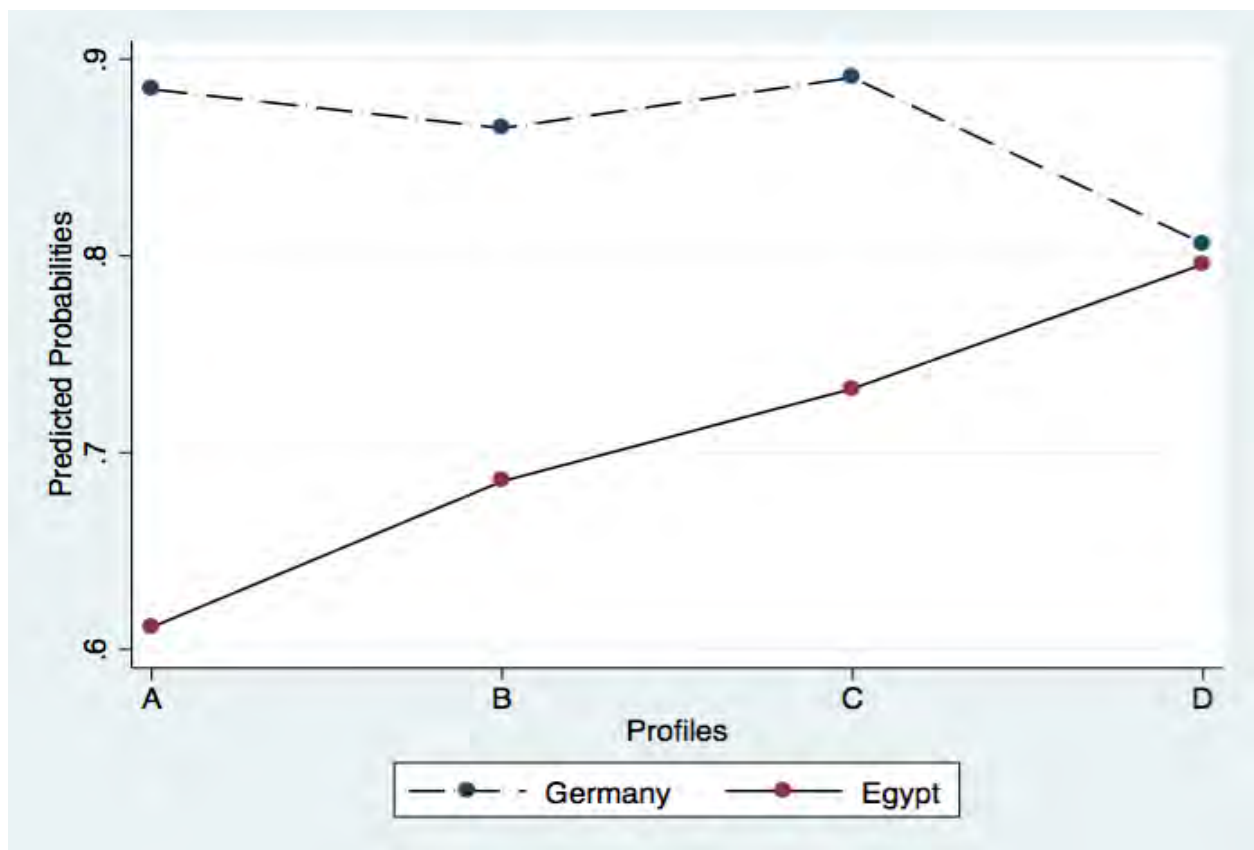
### Hypothetical Example (3)

Explanatory Variables	Hypothetical Profiles in 2012			
	A	B	C	D
Nationality	<b>Varying</b>			
Years of Schooling	18	18	18	18
Age	24	29	34	39
Age <sup>2</sup>	576	841	1156	1521
Marital Status	Single	Married	Married	Widowed
Residence	Urban	Urban	Urban	Urban
Relation to Household	Daughter	Spouse	Spouse	Head
Number of Children	0	0	1	3
Household Size	5	2	3	4
Wealth	3	2	3	3

Through the use of the *Comparative Specific Model* (8), the predicted probabilities for each country for each profile were estimated

$$\begin{aligned}
 FLFP_{C_i} = & \alpha + \nu Country_i + \mu YSCHL_i + \rho PF_i + \sigma HHF_i \\
 & + \kappa_1 Country_i * YSCHL_i \\
 & + \kappa_2 Country_i * PF_i \\
 & + \kappa_3 Country_i * HHF_i + \varepsilon
 \end{aligned}$$

Figure 14: Predicted Probability of Participating in Germany versus Egypt



The figure above demonstrates how the predicted probability of participating for both countries for the given set of profiles (Hypothetical Example (3)) change with the change in certain personal and household factors. As shown above the predicted probability of participating for a German female is always above that of an Egyptian female. The gap between the German and Egyptian female is huge given female's profile A and the gap starts to shrink as we move from profile A to D. In accordance to the graph above and hypothetical example (3), the illustration that follows compares each profile with the one before.

<b>German Female's Predicated Probability of Participating in the German Labor Market</b>
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	<b>Profile B Versus Profile A</b>	<b>Profile C Versus Profile B</b>	<b>Profile D Versus Profile C</b>
<b>Change in Predicted Probability</b>	<i>Decreased</i>	<i>Increased</i>	<i>Decreased</i>
<b>Probable Reasons for the Change</b>	<ul style="list-style-type: none"> <li>• Marriage</li> <li>• Decrease in wealth</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in wealth</li> </ul>	<ul style="list-style-type: none"> <li>• Three children</li> <li>• Being a widow</li> </ul>

<b>Egyptian Female's Predicated Probability of Participating in the Egyptian Labor Market</b>
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<b>Change in Predicted Probability</b>	<i>Increased</i>	<i>Increased</i>	<i>Increased</i>
<b>Probable Reasons for the Change</b>	<ul style="list-style-type: none"> <li>• Decrease in wealth</li> </ul>	<ul style="list-style-type: none"> <li>• Getting older</li> </ul>	<ul style="list-style-type: none"> <li>• Being the head of the family</li> <li>• Getting older</li> </ul>

The hypothetical example is another way to look at how personal and household factors differently affect each country and how certain factors could increase FLFP in one country and decrease FLFP in another country. In short, it is clear that number of children and marriage greatly affect an Egyptian or German female's tendency to participate in the labor market. This goes back to the fact that marriage and children require females to devote their time and effort to household activities and childcare. Moreover, due to the effect of wealth on FLFP in Germany and since German females tend to leave their family's' house at early age; this might be an important reason why German females tend to work rather than just staying at home. Whereas Egyptian females who live in their parents' house till the age of marriage and gain their wealth from accumulated household assets, tend not to participate in the Egyptian labor market.

## Policy Implications

Based on the results of this paper, some policy implications could be drawn targeting higher FLFP.

Policy implications targeting the Egyptian FLFP:

- 1- Based on the Egyptian educational system, a policy implication would be to encourage females who intend to take school up to high school level to opt for the vocational track, seeing that it offers a positive effect on female's labor market participation. Government might consider providing vocational training to females to upgrade their skills and hence enter the labor market much easier. On the other hand, if females choose to join general high school rather than vocational high school, families should then encourage their daughters to join university, as it offers the highest marginal return on female labor force participation.
- 2- Marriage is deeply rooted in the Egyptian culture and Egyptian married women are usually considered to be fully responsible for household activities and the husband is the one responsible to work away from home for wage. Consequently, policies targeting a lower marriage rate might not really succeed in such a country. However, two strategies might be used to enable and encourage married females to participate in the labor market. On the one hand, adjusting the working conditions to facilitate women's participation in the labor force such as; flexible working hours. Therefore, allowing women to participate in the labor market, while still having time to carryout household responsibilities. On the second hand, non-profit organizations targeting economic integration of women in business and employment as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) should be motivated to cooperate with national civil society organizations to raise awareness on the nationwide level on the importance of women's integration and empowerment in the Egyptian economy. Also, efforts need to be made towards changing the perception and cultural attitude, which considers women as the sole individual responsible for household work.

- 3- It is also well known that the Egyptian culture supports high fertility and birth rates and as hypothesized, findings support that the number of children greatly impacts the female's decision to participate or opt out of the labor market. Therefore, low fertility and birth rates might be considered key elements inducing females to participate in the Egyptian labor market. A policy implication in such a case might be; the use of a national awareness campaign targeting family planning to help individuals and couples decide whether to have children and when the appropriate time to do so given their current capabilities and income. This would help families weigh the financial benefits and costs of getting additional children, and considering the opportunity cost (return from participating) of having an additional child and not participating in the labor market. Furthermore, applying birth control policies such as "one-child policy" to decrease fertility rates, while customizing such a policy to fit the Egyptian culture, religion and norms may also allow females to participate in the labor market.

Policy implications targeting the German FLFP:

- 4- It is compulsory by the German law that children get a minimum of nine to ten years of schooling. Results show that an additional year of schooling increases the German female's predicated probability of participating in the labor market. So what about a 12-15 compulsory years of schooling for females especially that higher education in Germany is almost free of cost. Encouraging females to spend more years in schooling might on the long run boost FLFP.
- 5- The rising life expectancy and declining birth rates in Germany led to the phenomenon known as ageing population. With such a trend, applying birth control policies as suggested with Egypt would not be the best solution. Therefore, to tackle the issue of the negative impact of number of children in Germany on FLFP, a policy implication could be to offer affordable childcare facilities and centers to children who are 12 months or older, thus encourage women to participate in the labor market. Moreover, providing women with part-time jobs and flexible working hours would allow them to work and take care of their children. Therefore, perhaps maintain a better balance between work and home.

## 5. Conclusion

FLFP has proved to be an essential tool for the enhancement and socio-economics development of a nation as it promotes efficiency and equity. That is why higher FLFPR has been one of long-term goals that countries; developed and developing try hardly to achieve. For such reasons this paper has tried to study how personal and household factors might promote or hinder FLFP. Specifically the paper targeted two main literature gaps.

Firstly was the unclear relationship between educational attainment and Egyptian FLFP. Accordingly, the first aim of this paper was to investigate the effect of educational attainment and other personal and household factors on Egyptian FLFP. Concerning the impact of education on the Egyptian females' participation rate, results suggest that if a higher female participation in the labor market is desired then females should either go for general high school and then go for university education or go straight away to vocational high school to enter the labor market directly. This was evident through the analysis of the educational attainment coefficients, which showed that for education to positively impact the Egyptian FLFP, females should get a minimum of university degree or vocational high school degree. Further analysis of other personal and household characteristics indicate that a number of factors affect the Egyptian FLFP, some of which have a positive influence which include being single, living in a rural area, having previous work experience, and if the woman's mother is employed. On the other hand, variables such as the woman's father being educated or the woman having some sort of domestic help offered at home have a negative influence on FLFP.

Secondly was exploring the effect of personal and household factors on Egyptian FLFP versus German FLFP. Given that it was well observed that participation of women in the labor market varies greatly across countries, it was important to explore if and how certain personal and household factors affect FLFP in a developing versus a developed economy. Therefore, the second aim of this paper was to investigate whether the relationship between personal and household factors and FLFP is notably different in Egypt than Germany or not. Based on the empirical analysis used, it was found that divergent countries affect FLFP; this goes back to the differing social values, norms, religious views, cultural diversity and the economic development of each country. Further empirical analysis showed that number of factors affect FLFP in both

countries, some of which has a positive influence as years of schooling and age, while others with a negative impact as being a married women, and number of children. On the other hand some other variables impact each country differently as wealth. In addition, some variables showed an insignificant impact on FLFP of both countries as; relation to household (head or daughter) and household size. Additionally, it was evident that years of schooling has a higher marginal effect on the Egyptian FLFP yet, age, being married and number of children have a higher marginal effect on German FLFP.



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