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A Comparative Analysis of the Difference
in Female Employment Between Spain and
Portugal

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*Dissertation submitted in partial fulfillment of the requirements for the degree of MSc in Economics at
Católica-Lisbon School of Business & Economics, August 2015*

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ABSTRACT

This study tries to explain why, according to official data, the female employment in Portugal is 9,4% higher when compared to Spain. Previous literature has found relevant drivers when analyzing employment gaps such as fertility and policies concerning fertility, part-time employment, inconsistency in educational attainment; and on a cross-country basis, cultural aspects such as attitudes towards the woman's role in society. Although a substantial amount of research has been made, comparing the south with the north of Europe, there is a lack of literature on the comparison of the two Iberian countries. This study tries to fill this gap using data from the European Values Survey. It incorporates variables such as age, fertility, growing up with a working mother, education level, marital status, as well as attitudes towards female labor market activity, in a binary model in order to explain the probability of a woman working. Findings show that education, marital status, attitudes and having grown up in a household where the mother works may be important factors explaining this disparity in employment levels.

RESUMO

Este estudo tenta explicar por que, de acordo com dados oficiais, o emprego feminino em Portugal é 9,4% maior quando comparado com Espanha. Literatura precedente encontrou fatores relevantes para analisar as diferenças de emprego, como a fertilidade e as políticas relacionadas com a fertilidade, part-time emprego, inconsistência no nível de escolaridade; e em uma base cross-country, aspetos culturais, tais como atitudes em relação ao papel da mulher na sociedade. Embora uma quantidade substancial de investigação tenha sido feito comparando o sul com o norte da Europa, há uma falta de literatura sobre a comparação entre os dois países ibéricos. Este estudo tenta explicar a diferença cross-country nas taxas de emprego das mulheres entre Portugal e Espanha, utilizando dados do European Values Survey. Ele incorpora variáveis como a idade, a fertilidade, a crescer com uma mãe que trabalha, nível de educação, estado civil, bem como atitudes em relação à atividade do mercado de trabalho feminino, num modelo binário para examinar a probabilidade de uma mulher trabalhar. Os resultados mostram que o nível de educação, estado civil, atitudes e tendo crescido em uma casa onde a mãe trabalha podem ser fatores importantes para explicar esta disparidade nos níveis de emprego.

ACKNOWLEDGEMENTS

First and foremost, I would like to express sincere gratitude to my academic advisor Professor Miguel Gouveia for all the guidance, useful insights and support throughout this entire thesis process. I would also especially like to thank my academic director Professor Teresa Lloyd-Braga for all her support during these two years as a Católica-Lisbon master student.

Most of all, I am thankful to my family, and especially to my parents, who have always believed in and supported me through all my endeavors. To my chosen second Norwegian family: Carina, Maria, Martine, Jeanett and Christina. –Without you I would surely not be the person I am today.

On a broader note, I would like to thank my Lisbon and Brussels people who made this master's degree such an unforgettable experience. A Special thanks goes out to my support crew: Martine, Agata, Valentina, Maria and Andrea. –Thanks for the laughs and the tears one is forced to experience when battling through a master's degree. To my study buddies Vasco and João: –You indeed made some of the most unbearable parts bearable. And last, but not at all least: CarloAlberto, Markus, Paul, Francisco, Suzanne, Julian, Karoline, Nina, Marianne, Riccardo, Denis and Alena. –Thanks for all the memories created during these two hallucinating years. Ultimately, it was all worth it.

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1. INTRODUCTION

Spain and Portugal have many similarities in their history. Both countries endured long-living dictatorships that ended in the 70s, consequently sparking an evolution both socially and in the labor market, while returning to economic and political stability in the 80s (Blanchard and Jimeno, 1995, Cantó et al., 2002), and furthermore, joining the European Union in the mid-eighties (Macedo and Santos, 2013). Given these seemingly similar facts, one might be tempted to assume that they have the same female employment rates. However, despite the similarities, official data presents a 9,4% difference between the female employment in Spain and Portugal, with the former coming up short (Eurostat, 2015b). The two countries also exhibit significant differences with respect to some other important aspects. Spain is four times more populated than Portugal (Eurostat, 2015g) and much wealthier in terms of GDP per capita (Eurostat, 2015d). Moreover, the job security legislation is tighter, unemployment benefits are larger, and the collective wage bargaining is less flexible in Spain than in Portugal (Cantó et al., 2002, Bover et al., 1998). Nevertheless, the latter might be one explanation for the higher earnings inequality that can be witnessed in Portugal (Cantó et al., 2002, Bover et al., 1998).

Table 1 works as an overview of the evolution of working women in a selection of European countries. We can see that the crude rate of net migration – the ratio of the net migration during the year to the average population in that year, per 1000 inhabitants – was overwhelmingly high in Portugal during the mid 70s, compared to other European countries, including Spain. Furthermore, the female employment rate – the ratio between the employed population and the population aged 15 years and over – in Portugal in the mid-80s was double the size of the Spanish, until it reached its peak in 2002, and stagnated. This can be seen in relation with the growth rate of the two economies, as the Spanish rate of GDP growth surpassed the Portuguese rates during the end of the nineties. The activity rate, – the ratio of the labor force to the population aged 15 and over, in percentages – which also includes the unemployed, of the Spanish females has in fact almost caught up with the Portuguese.

TABLE 1. Historical Time Series Overview

	Crude Rate of Net Migration (per 1000)					
	1974	1975	1981	1991	2001	2011
France	0,6	0,3	1,0	0,6	3,0	0,5 (b)
Greece	2,2	6,5	0,2	11,7	3,1	0,4
Italy	0,5	0,4	-0,6	0,3	0,7	1,3
Portugal	19,9	38,2	0,8	-3,3	5,4	-2,3
Spain	-0,7	0,4	-0,8	1,8	12,5	1,4
The Netherlands	2,3	5,1	1,0	3,3	3,5	1,8

	GDP Growth Rate					
	1986	1992	1995	2002	2012	2014
France	2,4	1,6	2,1	1,1	0,3	0,4
Greece	0,5	0,7	2,1	3,2	-6,6	0,8
Italy	2,9	0,8	2,9	0,3	-2,8	-0,4
Portugal	4,1	1,1	4,3	0,8	-4	0,9
Spain	3,3	0,9	2,8	2,9	-2,1	1,4
The Netherlands	2,8	1,7	3,1	0	-1,6	0,9

	Female Employment Rate (%)					
	1986	1992	1995	2002	2012	2014
France	41,3	41,2	41,4	44,3	46,7	46,8
Greece	30,6	29,8	30,6	34,0	31,6	30,8
Italy	28,3	29,3	28,2	32,1	35,0	34,6
Portugal	40,2	47,1	45,6	51,2 (b)	46,2	46,1
Spain	20,8	25,9	25,6	35,4	40,1	39,6
The Netherlands	35,7*	42,5	44,1	54,3	56,4	54,7

	Female Activity Rate (%)					
	1986	1992	1995	2002	2012	2014
France	47,1	47,3	48,2	49,1	51,8	51,8
Greece	34,6	34,2	35,5	40,1	44,0	44,1
Italy	34,1	34,0	33,6	36,8	39,7	40,1
Portugal	45,5	49,5	49,5	54,1 (b)	54,7	53,8
Spain	27,7	34,6	36,8	42,1	53,4	53,1
The Netherlands	41,5*	46,1	48,3	55,9	59,5	58,6

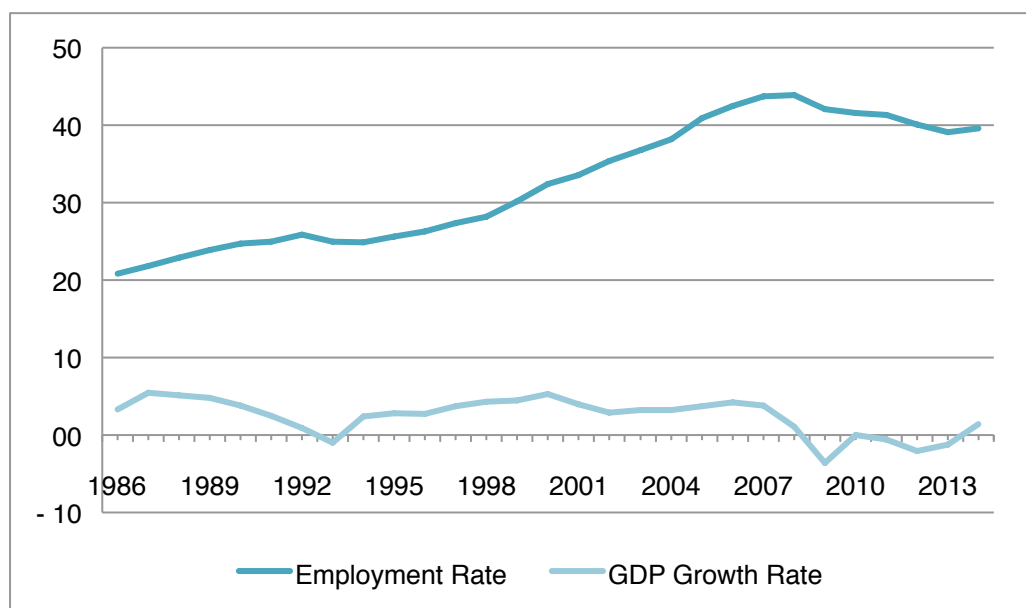
Source: Pordata (2015a), Pordata (2015c), Pordata (2015b),
*: 1987, b: break in series

We can argue that the observed numbers of crude rate of migration in particular, might suggest that some of the difference in female employment between Spain and Portugal may be a cause of demand and not necessarily supply of female labor. The 1933 Constitution of the Portuguese authoritarian regime Estado Novo wanted to keep close control over the labor exportation, and the freedom to emigrate was only made legal when written into the 1976 Constitution that followed the Carnation Revolution (Baganha, 1998). In spite of this,

research suggests that between 1959 and 1980 more than one million Portuguese left the country illegally (Baganha, 1998). In fact, these migrants were for the most part unskilled, young adult males (Baganha, 1994), which led to a shortage of labor and consequently recruitment of female workers (Torres et al., 2011). Some sociologists and historians suggested that the outflow of Portuguese migrants in this period was due to the duality, of modern and traditional economy, of the society (Nunes, 1964), and economists for the most part emphasized factors such as international wage differences (Baganha, 1998). We do however know that there was an unknown number of emigrants leaving Portugal as a protest against the regime or to escape the mandatory military service due to the colonial wars in Africa (Baganha, 1994). In the years following the 1974 revolution more than four hundred thousand Portuguese were forced to return from the African colonies, as well as more than one hundred thousand troops (Baganha, 1998).

Summarizing, one reason for the historical difference between Spanish and Portuguese employment rates of females may be due to the fact that Portuguese men left the country, consequently leaving the women not only with greater employment opportunities, but also in need of an income to support the household. When the colonial wars ended, and the men returned to the country, it permitted large transformations in the Portuguese society (Torres et al., 2011), and it is not difficult to imagine that women were reluctant to go back to their former dependency.

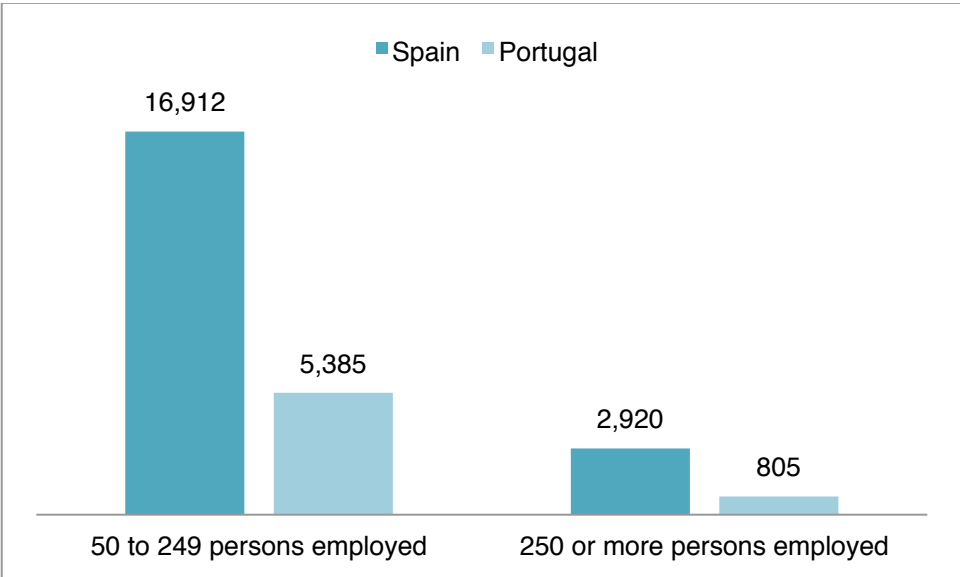
FIGURE 1. Female Employment And Growth Rate Of GDP, Spain



Source: Pordata (2015c), OECD (2015c)

However, as previously stated, the rate of employment in Spain has increased drastically the last thirty years. Figure 1 plots the Spanish female employment rate versus the GDP growth rate. The pattern in evolution of female employment rate in Spain follows, to some extent, the growth of the economy, which might suggest that the demand for female employment in Spain is a major cause for its increase in employment levels, which is slowly catching up to Portugal.

FIGURE 2. Number Of Large Enterprises In 2010



Source: Eurostat (2015a)

Furthermore, the number of large enterprises located in Spain is much greater than in Portugal. Figure 2 illustrates this difference, strengthening the argument of demand growth as a reason for the sudden growth in employment, and consequently also activity levels of women in Spain, compared to Portugal, the last decade.

2. LITERATURE REVIEW

2.1. INTRODUCTION

Many academics have tried to explain cross-country differences in female labor market participation. The traditional approach relied on pure economic variables such as the wage gap, and human capital investment. For instance, one of the founding fathers of New Home Economics, Mincer (1962), considers the female labor supply to be contingent on demographic attributes, such as male and female earnings, non-earnings income, number of

children, and age (Hill, 1983). In his basic model of labor economics, women allocate their time between labor market work, household work and leisure, where their decision depends on changes in the market wage relative to household productivity (Mincer, 1962, Arellano and Bover, 1995, Katz, 1997, Willis, 1973). This, provided that there exists a positive substitution effect from the higher wage, is larger than the negative income effect due to higher household income. The second co-founder of this approach to the economics of family decisions, Becker, was the first modern mainstream economist to take the production of goods and services within the household seriously (Katz, 1997, Jaumotte, 2003). The theory of New Home Economics has, however, received critique due to its failure in considering the individuals who make up the families and the power relations that affect the allocation of the resources within a given household (Katz, 1997).

In general, academics agree on the fact that the women's age, schooling, the availability of part-time jobs and child care all have positive effects on their labor supply (Antecol, 2000, Bardasi and Gornick, 2000, Willis, 1973). A theory behind the major shift in female participation is that it is resulting from structural factors that have shifted female earnings potential, in particular from the increase in university education and the decrease in birth rates (Arellano and Bover, 1995). Nevertheless, the existence of the *double burden*, an expression commonly used in gender studies to describe women's work in the labor market and their unpaid private care and housework, is also considered as limiting female participation (Macedo and Santos, 2013, Jaumotte, 2003).

During the last decades the research shifted towards tracing processes of social change, and focused more on issues such as culture and preferences with regards to intra-household and labor market decisions (Bardasi and Gornick, 2000). The behavior of the family as a complex social institution, is determined jointly by the preferences and capacities of the members, combined with the social and economic environment in which they are placed and expect to face in the future (Willis, 1973, Katz, 1997). Moreover, in cross-country comparisons, some research focuses on the unaligned stages of development of countries (Macedo and Santos, 2013), and in the manner that social and economic factors are restricted because of this, even though we can observe a decline in fertility as well as an increase in participation rates across almost all industrialized countries (Ahn and Mira, 2002).

The labor market in Spain, on the other hand exhibits the lowest female employment rates in the EU (Eurostat, 2015b), as well as one of the largest wage gaps between genders (Cebrián and Moreno, 2015). Thus, we could question if, to some extent, low female participation levels observed in the South are due to market failures and policy distortions, and if they might reach higher welfare levels by removing or correcting for these (Jaumotte, 2003). Indeed, some researchers argue that the changes in the theoretical approach to within-household decisions are especially important for economic policies, seeing that the effects of these policies are not neutral in regards to within-household resource distribution (Del Boca et al., 2003). In fact, they can lead to contrasting behaviors, depending on, for instance, if the male or the female is the main beneficiary of the policy (Del Boca et al., 2003).

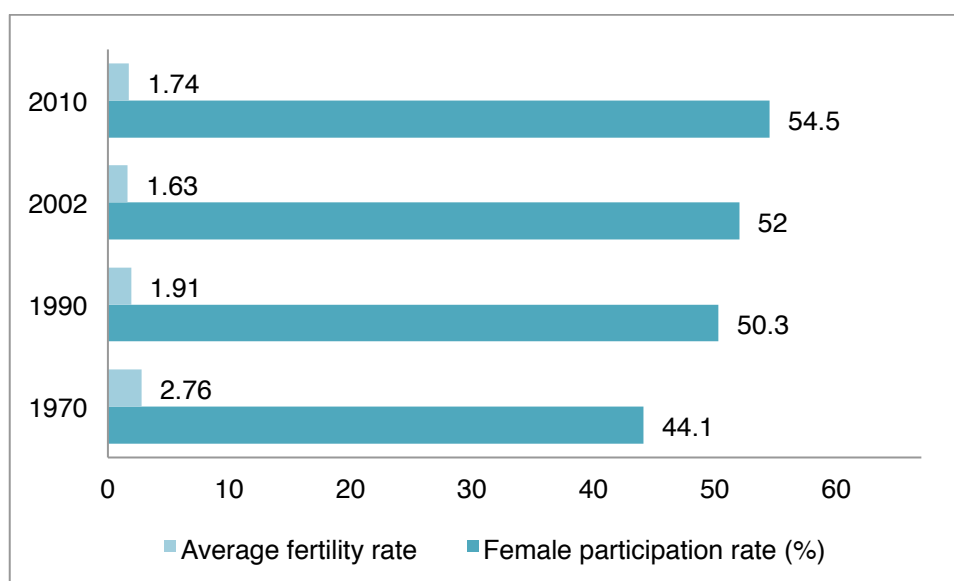
2.2. FERTILITY

2.2.1. Fertility Rates

As previously touched upon, fertility and female labor market participation might still be considered as mutually exclusive events in many countries. Actually, fertility can be considered as a main determinant of participation, where an increase in participation has been associated with a decrease in fertility rates (Arellano and Bover, 1995), particularly since being a mother reduces the probability of working (Bardasi and Gornick, 2000). Today, there has been research devoted to the study of the interrelationship, although economists traditionally were hesitant to study fertility behavior because of difficulty to incorporate it in traditional consumer theory (Willis, 1973). In fact, over two centuries ago Malthus predicted a positive association between growth of the population and growth of income, based on the assumption that when incomes are higher, people marry earlier and decide to have more children (Ahn and Mira, 2002, Becker, 1960). Over the last hundred years, however, we have witnessed nations go through industrialization, and experience growth in incomes accordingly, while the rate of fertility tumbled (Ahn and Mira, 2002).

In OECD countries the participation rates of females aged 15+ have steadily increased over the last century, and Figure 3 illustrates the evolution over the last forty years. On the other hand, the fertility rates dropped substantially from the 70s, through the 90s, and reached a low point in 2002, where the average number of children per women between 15 and 49 was only 1.63. Nevertheless, the fertility rate started to increase after 2002.

FIGURE 3. Evolution Of Fertility and Participation Rates (15+) in OECD



Source: OECD (2015b), OECD (2013)

Table 2 lays out more detailed information for a selected group of European countries as well as the EU average. Female participation of females between 25 and 64 has increased in all the countries, although the numbers for Spain exhibit higher growth rates than Portugal. Furthermore, the total fertility rates have decreased in all countries, except for Sweden.

TABLE 2. Evolution of Fertility and Participation Rates In Europe

<i>Female participation rate (25-64) (%)</i>	<i>1983*</i>	<i>2000</i>	<i>2014</i>
Spain	34.7	45.0	57.2
Portugal	59.8	67.1	66.7
Italy	40.1	42.9	52.6
Sweden	78.3	76.7	80.7
EU (27) average	-	58.3	65.6
<i>Total fertility rate</i>	<i>1980*</i>	<i>2000</i>	<i>2013</i>
Spain	2.20	1.23	1.27
Portugal	2.18	1.55	1.21
Italy	1.64	1.26	1.39
Sweden	1.68	1.54	1.89
EU (27) average	-	1.48	1.55

Source: (*) Del Boca et al. (2003), Pordata (2015d), Eurostat (2015c)

In order to explain this detected negative relation between fertility and income, new models have been developed. Becker (1960) introduced fertility in the economic framework, emphasizing the interaction of income and fertility while distinguishing between the cost and

quality of children, claiming that the latter, rather than the former, depends on parental choice (Willis, 1973, Arellano and Bover, 1995). Additionally, he asserted that increases in incomes might lower fertility levels provided that the income elasticity of the quality of children is adequately greater than the income elasticity of the number of children (Becker and Lewis, 1974, Becker, 1960, Willis, 1973). Furthermore, Mincer moved the attention from income effects to the consequence of cost variation of having children, and showed that the opportunity cost of the women's time, measured as her wage rate, is negatively related to fertility (Willis, 1973, Del Boca et al., 2003, Ahn and Mira, 2002). Moreover, Willis (1973) predicted with his household fertility choice model, that higher female wages and education levels motivate an increase in their labor supply and a reduction in fertility (Del Boca, 2003, Del Boca et al., 2003).

A significant amount of research in the last few decades has gone beyond the wage returns in analyzing female participation and fertility decisions. Some focus on other factors that might influence the decisions, such as individual, household, and labor market characteristics, as well as availability of child care services provided by the state (Del Boca et al., 2003). Influential, yet largely criticized research on female choices between market work and family work is the so called preference theory approach set forth by Hakim (2003). Emphasizing personal values and attitudes in decision making as the center of causal explanation on the micro-level, she criticizes previous research on fertility decisions for over-generalizing female citizens of a country, and argues that their decisions are heterogeneous across lifestyles, and not homogenous within a given country (Hakim, 2003). Furthermore, this theory also takes historical factors, such as the contraceptive revolution during the 60s, into account for explaining the sudden drop in fertility, and argues that when women are in control over decisions regarding fertility, it will be their preferences and values that react to public policies (Hakim, 2003). It was the states neglect of these types of factors that resulted in the sharp fall in fertility in what Hakim (2003) calls for *familistic* societies, that we can observe in for instance Spain.

There exists empirical evidence which shows that, in the south of Europe, such as Spain and Italy, it is more difficult to combine work and children than in other parts of Europe, which might explain the low levels of both fertility and participation rates, and the institutions are important to clarify the differences (Del Boca 2003). Some of the reasons can be attributed to the poor availability of child care services together with the tendency of longer working

hours, the growing unemployment rates, and the labor market regulations concerning hiring and firing (Bover et al., 1998, Del Boca et al., 2003, Ahn and Mira, 2002, Del Boca, 2003). Accordingly, women would be susceptible to continue working while having children, if more flexible employment opportunities were created (Del Boca, 2003). Correspondingly, one might also argue that the lower fertility and participation rates in Spain and Italy are due to the fact that females marry later, which again might be due to the fact that they are in general attaining higher education levels than before (Davia and Legazpe, 2014). In the Northern European countries, on the other hand, both fertility and participation rates are high, which might be due to the part-time employment opportunities available (Del Boca et al., 2003).

TABLE 3. Fertility Rates and Benefits

	<i>Fertility Rate</i>	<i>Part-Time (%)</i>	<i>Maternity leave*</i>	<i>Parental leave*</i>	<i>Paid maternity and parental leave*</i>	<i>Paid paternity leave*</i>
Germany	1.38	46.3	14.0	148	58.0	8.7
Italy	1.43	32.1	20.0	26.0	46.0	17.5
Netherlands	1.72	76.6	16.0	26.0	42.0	0.30
Portugal	1.28	12.6	6.4	23.7	30.1	21.3
Spain	1.32	25.5	16.0	52.0	16.0	2.10
Sweden	1.91	37.3	8.6	51.4	60.0	10.0

Source: Pordata (2015d), Eurostat (2015f), OECD (2015e)
*in weeks

2.2.2. Child Care Costs

Fertility and participation rates are positively influenced by social policies aimed at reducing the costs of having children, such as improving the provision of child care (Del Boca, 2003, Del Boca et al., 2003, Ahn and Mira, 2002). Child care subsidies have the effect of increasing the relative return of market work, by reducing the relative price of child care (Jaumotte, 2003). In the majority of the countries that exhibit high fertility rates, child care benefits are also high, while the opposite is true for the southern countries of Europe, such as both Spain and Portugal (Jaumotte, 2003). Additionally, in the south, where the child care benefits provided are not designed to accommodate both working parents, the role of the extended family as a support network, i.e. informal child care, is important for the decision to participate while having children (Del Boca, 2003). So, as people move closer to employment opportunities, and at the same time away from their immediate family ties, the demand for

provision of services will necessarily increase (Del Boca, 2003), and consequently, we can question if the women's path to social rights depends on access to care of children (Sunström, 1999). Furthermore, empirical research shows that subsidized child care tends to encourage full-time employment, rather than part-time employment (Jaumotte, 2003). Although this may be true, some research divides women in any given country into three subgroups consisting of home-centered, adaptive and work-centered women, placing the majority of the female population in the middle group, and argue that their values and preferences are essentially different, and may consequently come into conflict with one another in matters such as publicly provided child care services (Hakim, 2003). This thought will be further elaborated later.

2.3. LABOR MARKET INSTITUTIONS

Some academics suggest that the overall increase in female participation in the last century might be due to technical changes towards non-manual labor in the production practices, resulting in a shift in the earnings potential and higher demand for skilled non-physical labor, that consequently uncovered new opportunities for women (Bover et al., 1998, Arellano and Bover, 1995, Cantó et al., 2002, Vieira et al., 2005). Albeit, as previously mentioned, there still exists a large variation across countries, which might be explained by differences in labor market institutions (Antecol, 2000). For example, in the case of Spain, where we observe a declining fertility accompanied by higher education levels, the shortfall in participation can be due to the lack of support from the Spanish institutional framework with regards to a combination of female employment and motherhood (Davia and Legazpe, 2014, Cebrián and Moreno, 2015). On the other hand, Portugal experienced a decline in unemployment levels starting in the mid-eighties until 2000, as well as a modernization and restructuring of the economy after joining the European Union, which lead to an increase in demand of skilled workers, but also increased the overall wage inequality (Vieira et al., 2005). Furthermore, it is notable that women, in for instance Portugal, suffer from both vertical and horizontal segregation, signifying that they have less possibilities to enter some industries or certain types of jobs, as well as progressing into higher positions (Macedo and Santos, 2013). Additionally, it is true that women still do not receive equal pay for equal work, with unadjusted figures for Portugal showing a 13% lower wages for female than men, and Spain showing 13.9% (Eurostat, 2015e).

TABLE 4. Decomposed Gender Wage Gap

	<i>Spain</i>	<i>Portugal</i>
Net daily gender wage gap (%)	13.09	23,8
<i>Unexplained by attributes</i>	<i>89,35%</i>	<i>64%</i>
<i>Explained by attributes</i>	<i>10,65%</i>	<i>36%</i>

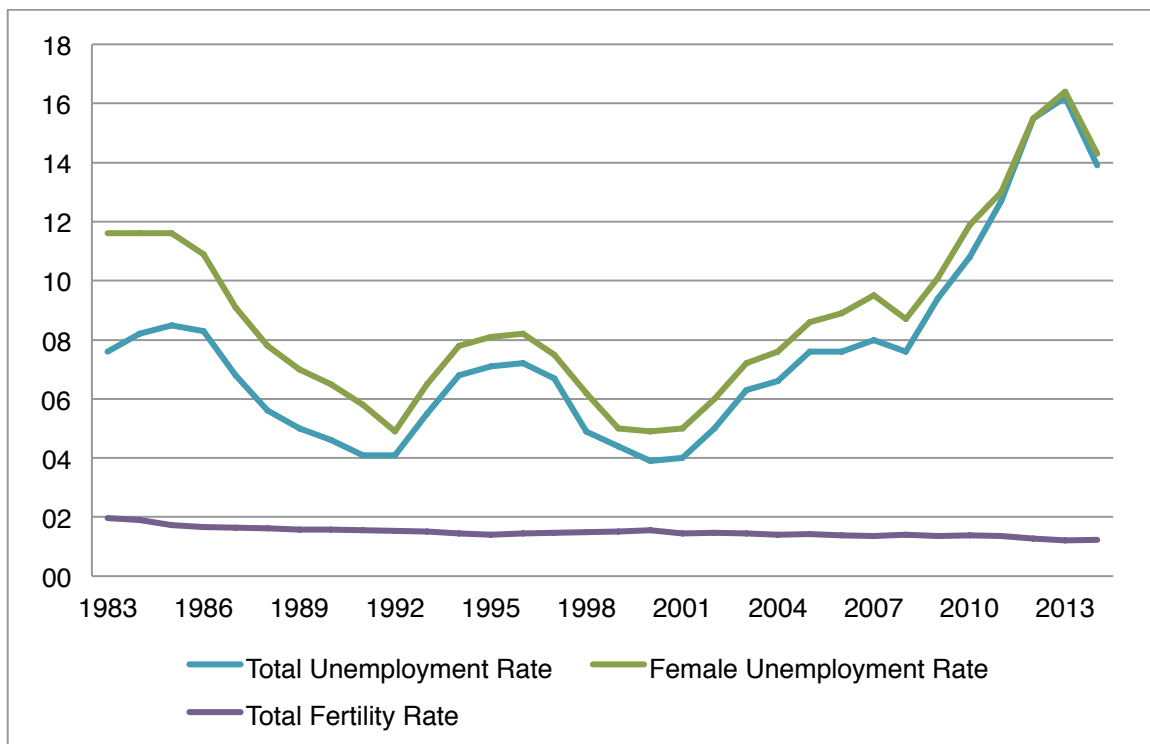
Source: Cebrián and Moreno (2015), González et al. (2005)

Table 4 illustrates research results (the numbers for Portugal are taken from a research paper by González et al. (2005) based on data from the Personnel Records (*Quadros de Pessoal*) for the period 1985-2000) for the adjusted wage gap in Spain and Portugal, where the percentage of the gender wage gap that is unexplained by differences in attributes between males and females, i.e. the level of discrimination, is 89,35% and 64% in Spain and Portugal respectively. Consequently, because of these formal, as well as informal barriers related to the traditional male breadwinner mentality of, especially, the south of Europe, female's possibilities and positions in the labor market are weaker (Macedo and Santos, 2013), the policies need to be adapted accordingly (Cebrián and Moreno, 2015, Hakim, 2003).

2.3.1. Unemployment

Some research detects that the total fertility rate is pro-cyclical, meaning that it responds negatively to unemployment rates along the business cycles (Arellano and Bover, 1995), and deem the dramatic decline in fertility through the 80s and 90s in countries such as Spain and Italy to be partly caused by the high unemployment rates during this period (Ahn and Mira, 2002). By applying this thought to data on unemployment rates and total fertility rates in Portugal, from 1983 until the newest available data, we find that there is, in fact, a negative correlation (-0.45) between unemployment rates and the total fertility rates in the economy. The result is plotted in Figure 4. Furthermore, previous research show that in countries where wages and female participation rates are lower, the incidence of unemployment is also higher (Ahn and Mira, 2002, Jaumotte, 2003). In fact, studies reveal that Spanish women living in areas where employment prospects are good, are indeed more probable to participate in the labor market, regardless of being married or having children (Davia and Legazpe, 2014), implying that low participation rates of females might be due to lack of demand, rather than supply. Correspondingly, female participation may in fact be indirectly affected by labor market policies aimed at reducing the unemployment rates (Jaumotte, 2003).

FIGURE 4. Unemployment Rates Versus Total Fertility Rate in Portugal



Source: (Pordata, 2015e, Pordata, 2015d)

The intuition is that, in a bad economy wives will wish to work to secure household incomes in case of shocks to the husband's wage or employment, and thus insecurity leads to lower fertility (Del Boca et al., 2003, Ahn and Mira, 2002) and at the same time larger incentives for female participation (Jaumotte, 2003). Moreover, women will refrain from quitting their job in order to have children in periods of high unemployment rates, because this might weaken their future employment prospects (Ahn and Mira, 2002, Del Boca, 2003, Willis, 1973). When comparing women and men between the ages of 20 and 40, results show that women are more inclined to experience employment interruptions due to motherhood, resulting in lower experience gains and therefore also lower wages (Cebrián and Moreno, 2015, Cebrián and Moreno, 2013). The same research, however, finds that when staying in the same job for more than two years, women tend to have a greater wage increase than men. In effect, the wage gap could theoretically vanish if women could work without interruptions (Cebrián and Moreno, 2015).

2.3.2. Part-Time Jobs

Considering the labor market, what are the options available for the agents that are not participating, participating part-time and participating full-time? Since having children decreases the possibility of working, notably in full-time positions, part-time work is heavily

female dominated (Bardasi and Gornick, 2000, Sunström, 1999), and thus, the existence of this sort of employment opportunities increases the probability of female participation all across European countries (Bardasi and Gornick, 2000, Davia and Legazpe, 2014, Buddelmeyer et al., 2004), especially where preferences favor it (Jaumotte, 2003). In the presence of part-time employment opportunities, the choices available increase and therefore attracts workers who were previously unable or unwilling to work full-time (Buddelmeyer et al., 2004). However, this type of employment is more established in the northern part of the continent, which is illustrated in Table 5, where it is also true that a big share of the active women work in the service sector (Del Boca, 2003, Bardasi and Gornick, 2000). Based on this argument, some research suggests that one reason for the limited presence of part-time jobs in the south, such as in Spain and Portugal, may be that the service sector is less developed (Del Boca, 2003, Jaumotte, 2003).

TABLE 5. Part-Time and Service Sector Employed Women, 2013

	<i>% in part-time</i>	<i>% in service sector</i>
Spain	25,3	89,2
Portugal	16,4	77,2
Sweden	33,0	91,0

Source: OECD (2015d), OECD (2015a)

Firms often hire part-time workers to handle regular and predictable demand peaks or in order to extend opening hours in the evenings and in weekends, which would go beyond the working hours of a full-time employee (Buddelmeyer et al., 2004). Yet, there is a general concern in some countries that part-time work may marginalize women in the labor market, due to the fact these jobs often are characterized by lower wages, fewer fringe benefits, less job tenure and training availability (Jaumotte, 2003, Buddelmeyer et al., 2004). All the aforementioned factors could potentially result in lower chances of promotions, and higher risks of dropping out of the labor market (Jaumotte, 2003).

2.3.3. Parental Leave

Economic theory proposes that parental leave policies, which help women reconcile market and household labor (Jaumotte, 2003), result in more women staying active in the labor market, since they do not have to completely leave employment in order to give birth (Del Boca et al., 2003). This might strengthen their attachment to the labor market, through an increased sense of job security (Jaumotte, 2003). However, in an impact analysis of changes

made to maternity leave policies in Germany during the 70s, there was strong evidence that each expansion induced women to delay their return to work, and furthermore, that they had little effect on mother’s labor force participation rates, and in fact, that they even failed to increase employment continuity of mothers after childbirth (Schönberg and Ludsteck, 2007).

Some, however, argue that it is possible to see a relationship between the generosity of child-related policies (including maternal leave) concerning employment and women’s employment profiles, and assert that where the policies seem to be more generous, as in the Northern European countries, the participation levels of women are higher as well (Del Boca, 2003). Table 6 is an overview of maternity leave policies and their benefits in some European countries, which strengthens this argument.

TABLE 6. Maternity Leave Policies in Europe

	<i>Base maternity leave</i>		<i>Optional maternity leave</i>	
	Duration (weeks)	Benefits (% of wages)	Duration (weeks)	Benefits (% of wages)
Spain	16	100	128	7.28
Portugal	16	100	96	12.7
Sweden	14	66	64	66

Source: Based on data from 2001, Del Boca et al. (2003)

Nevertheless, we can expect the effect stemming from the duration of the offered leave to be negative, because the longer a woman is absent from the workplace, the greater the loss of opportunities of advancement and the greater the skill deterioration (Del Boca, 2003, Jaumotte, 2003), which in turn affects her wage (Schönberg and Ludsteck, 2007). However, on the other hand, a longer leave gives mothers more time to recover from childbirth, while at the same time not having to worry about job security, and therefore, both length and generosity of the benefits are positively related to fertility (Del Boca, 2003).

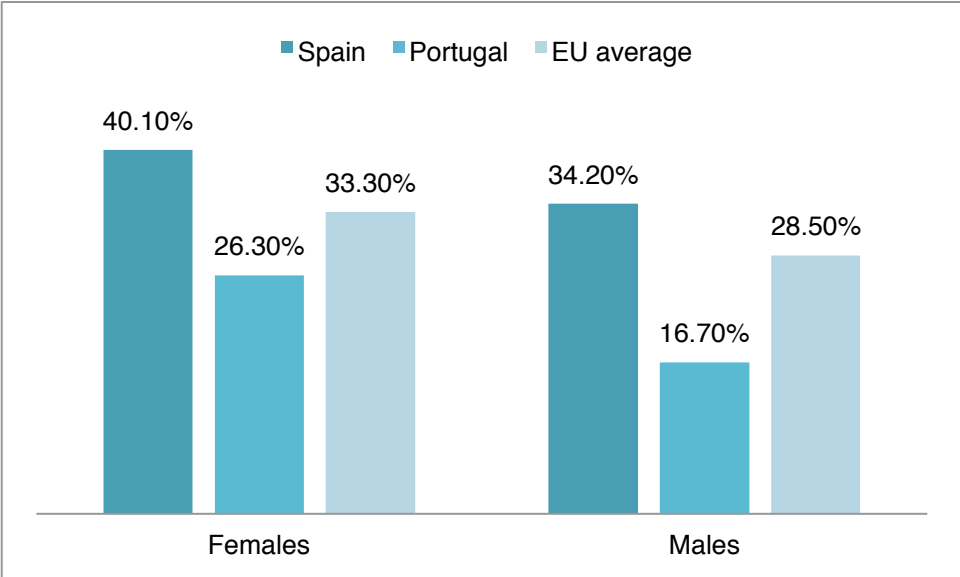
Furthermore, one might argue that in countries such as Portugal, where firms tend to be smaller (see Figure 2), the opportunity to take out parental leave may result in discrimination from the employer’s side. The intuition is that hiring females could potentially result in higher costs for small firms, since each person’s contribution to the company has bigger impact, and therefore female workers might be more difficult to substitute during potential periods of maternity leave.

2.4. EDUCATION

Education can to some extent be considered a simultaneous decision jointly with participation, because investments in human capital often are done in order to participate in the labor market, and therefore it might be desirable to use education variables as indicators of female earnings potential, instead of their average wage (Arellano and Bover, 1995). The increase in returns to knowledge, through a raise in productivity, and demand of skilled labor can be important determinants of the growth in female education levels (Arellano and Bover, 1995, Cebrián and Moreno, 2015). Albeit it is still true that even when women invest the same amount, or even more, in human capital than men, they are, on average, still paid less (Cebrián and Moreno, 2015), which was previously discussed in relation to Table 4.

The percentage of females and males between the ages 25-54 in Spain and Portugal that have completed tertiary education is illustrated in Figure 5, comparing it to the EU average. In both cases, we can see that Spain, in fact, has a larger share of population with a university diploma than Portugal, which might be a reason for its increase in female participation levels. Furthermore, and maybe more interesting, we see that in all three clusters, females are more educated than men.

FIGURE 5. Tertiary Educational Attainment in Ages 25-54, 2013



Source: Eurostat (2015h)

More specifically, Table 7 shows the evolution of tertiary educational attainments in Spain and Portugal since the beginning of the 90s. The number of females investing in tertiary education has increased substantially the last few decades. In fact, since 1992, females have

surpassed males. These figures may indeed alter the female positioning in the labor market in the future, since eventually there will be more skilled females than males in the labor market.

TABLE 7. Evolution of Tertiary Educational Attainment by Gender, in 1000

	Spain		Portugal	
	Male	Female	Male	Female
1992	1 550,3	1 348,3	242,1	316,8
2002	3 167,4	3 204,1	210,4	359,5
2014	4 520,2	5 080,9	505,5	832,2

Source: (Eurostat, 2015i)

On a slightly different note, there has been research on the role of education in shaping the labor market, as well as the fertility decision, which proposes that highly educated women postpone fertility and have a higher labor market attachment (Bratti, 2003, Del Boca et al., 2003, Del Boca, 2003). Actually, one of the “stylized facts” that we commonly observe in developed countries is the correlation between women’s education, labor force participation and fertility. However, when looking at data for countries with low average years of education for the female population, such as Spain, Italy and Portugal, it also reveals low total fertility rates (Bratti, 2003). In fact, empirical research also reveals that young and highly educated Spanish women are more likely to work and to be inclined to create stable employment careers, thus delaying fertility and consequently having fewer children (Davia and Legazpe, 2014).

2.5. CULTURE

2.5.1. Introduction

During the last few decades researchers have shifted their attention towards other determinants for the variations in female participation which the traditional measurement of human capital does not capture, but might be just as important to explain the probability of female participation (Antecol, 2003). In attempting to assess the effects of cultural factors on gender gaps in the participation rates Antecol (2000) examined ethnic groups within the US, and her results show that culture is significant to explain it. One reason that this type of study is interesting, is because the observed differences are “free” of institutional influence (Antecol, 2000). Particularly, it is possible to find reasons behind the gap in participation that are not attributed to cross-country differences in public institutions. Additionally, we can

consider that culture shapes the utility function of an agent, and thereupon modifies its behavior by influencing the allocation of time between market and home labor (Reimers, 1985). Furthermore, a large amount of papers have studied how culture and preferences towards participation reflect the rates across different countries (Willis, 1973). Some find that women are indeed more prone to work whenever men in their country are positive towards the idea (Antecol, 2003), while others asserts that cultural factors may in fact indirectly affect married women's participation levels by acting through other factors, such as their education, experience, and fertility choices (Reimers, 1985).

However, some argue that it is not possible to anticipate whether there is a connection between conservative values and lower labor market participation (Davia and Legazpe, 2014). Over the last forty years, Spain has undergone major political, social and economic transformations, through educational expansion and at the same time changes in preferences and values with regards to work and family (Davia and Legazpe, 2014). It has been rather difficult, however, to unwind whether lower fertility rates are a response to constraints due to lower attachment to the labor market, or if they are due to preferences (Davia and Legazpe, 2014).

2.5.2. Attitudes Towards Female Role

As a continuum of cultural effects, one might also consider attitudes towards the sexual division of household labor and formal labor participation, and how they influence women's decision to enter the labor market (Bardasi and Gornick, 2000, Antecol, 2000). The cross-country difference in participation of women depends to a large extent on the male attitudes towards family and sex roles, and in particular if the males are in favor of the women working (Sunström, 1999). Specifically, if male attitudes are supportive of female employment, and if the women had working mothers, then it tends to be stronger (Antecol, 2003). Furthermore, the husband's contribution to housework has a positive effect on participation and fertility (Del Boca, 2003).

In Portugal, women are the main contributors of household production, with the responsibility of housework, as well as caretaking of elderly, the ill, people with disabilities and children (Macedo and Santos, 2013). Furthermore, home production has traditionally been regarded as a better option to market labor, especially for women (Jaumotte, 2003). One might blame the lagging change of gender relations on this type of gender conflict inside the household, but

also on the lack of incentives created by governments (Sunström, 1999). Under these circumstances, women are sometimes forced to accept a black or grey labor market, as a result of social and labor market policies, as well as geographic and economic disadvantages (Sunström, 1999). Consequently, although it may offer a sensation of economic and personal achievement, they are in a sense cheated of social rights they would otherwise be entitled to in the formal labor market (Sunström, 1999, Macedo and Santos, 2013). The institutional conditions of a country are structured to suit a specific national context, which in turn is determined by historical, economic and social preconditions, and the policies of a country are indeed affected by normative influences (Sunström, 1999). Actually we can perceive policies as to shape, and at the same time are shaped by the actual possibilities available for paid and unpaid work (Sunström, 1999).

2.5.3. Family Ties

As a contribution to the literature on the importance of culture for economic outcomes, and the transmission of cultural traits across generations and their interaction with institutions, the importance of family values has been emphasized, acknowledging family ties as one of the most relevant cultural traits (Alesina and Giuliano, 2010). Focusing on Western Europe, and following the terminology of Reher (1998), we can divide countries between societies of “weak family ties” (the Scandinavian European countries) and “strong family ties” (the Mediterranean group). Strong family tie societies, which include both Spain and Portugal, are based on the “male-breadwinner hypothesis” in which the man works full-time and the woman dedicates herself to housework (Alesina and Giuliano, 2010). Results from the analysis show that strong family ties imply more home production of goods and services (such as child care and other housework) and less participation in market activities especially for women (Alesina and Giuliano, 2010). In the presence of strong family ties, in countries such as Portugal, the family is perceived as the main backbone of economic and social security, and thus there might be negative attitudes towards governmental intervention in the private sphere (Sunström, 1999, Alesina and Giuliano, 2010, Aboim and Wall, 2002). Consequently, seeing that women still have the main responsibility for the domestic and care work, then lack of social services provided by the government essentially becomes a female problem (Sunström, 1999). Table 8 summarizes some findings of a study done by Alesina and Giuliano (2010) analyzing the importance of family on economic behavior. The measure of *family ties* is based on answers from the World Value Survey that the researchers argue captures the beliefs on the importance of the family on an individual’s life.

TABLE 8. Family Ties

Increase in one standard deviation for family ties	
<i>Effect on female labor force participation</i>	-0.02*
<i>Effect on the belief that men should work when jobs are scarce</i>	0.02**
<i>Effect on home production</i>	11.6***

*about 4% of the sample mean, **almost 5% of the sample mean, ***14% of the sample mean

Source: Family values in 81 countries, Alesina and Giuliano (2010)

Moreover, this more “traditional” role for women and a higher fraction of young adults living at home, could account for the notable reduction in fertility in the south of Europe (Alesina and Giuliano, 2010, Davia and Legazpe, 2014). Furthermore, in the presence of what Bardasi and Gornick (2000) call *adult dependents* (elderly), the non-wage-earning adults living in the household, further reduces the probability of women working fulltime. Additionally, recent research has in fact expressed the need for an analysis of women’s decisions which are not only based on societal or individual factors, but also on the characteristics, preferences and values of the spouses with whom they share a household (Davia and Legazpe, 2014).

As proven, a substantial amount of research has been done in order to explain employment gaps in countries as well as across countries. Yet, there is a lack of research made on the curious difference in employment rates between the Iberian countries. Therefore, this study aims to explore the female participation levels in Spain and Portugal, and more importantly the difference between them, on the basis of the literature in this chapter.

3. RESEARCH METHODOLOGY

This study uses the probit and logit binary outcome models to analyze female participation levels in Spain and in Portugal, as well as the differences between the levels of the two countries. The following section will cover the research methodology used for the study. First part describes the data; second part defines the variables and the model used; and the last part explains the econometric theory behind *probit* and *logit* models.

3.1. DATA

The data used for this study of the cross-country difference between female employment levels in Spain and Portugal is gathered from the 2008 edition of the European Values

Survey. This extensive survey has come in four waves with nine-year gaps, beginning in 1981 covering 19 countries, until 2008 covering 47 countries in Europe, and ranges in topics from moral, religious, societal, political, work, and family values of Europeans. Because of this, it is possible to base the analysis not only on typical economic variables such as earnings and human capital investment, but also on sociological variables such as culture and values, which more recent research suggests might also be important to explain the differences in female employment levels. The representative countries' samples were drawn from the population of citizens over 18 years of age and the survey was carried out with face-to-face interviews. The data includes both individual demographic characteristics (age, gender, income, etc.) as well as human capital characteristics (education, labor market status, etc.) and our sample for Spain and Portugal combined is 1223 individuals. Since the statutory retirement age in Spain and Portugal was 65 when the survey was carried out, the sample for this study is limited to women aged between 18 and 64 in order to cover the ages where active labor market participation occurs. Moreover, in order to focus only on the employment of the population, the respondents who claim to be students have not been included in the analysis.

In the Portuguese sample there are 606 individuals meeting our inclusion criteria, where 61,7% are working, but only 8% part-time, and on average with 10 years of schooling. Furthermore, the mean age of the female respondents is 44,5 years and on average the working age women in the sample have 1,56 children each. Moreover, 70,5% of the female population in this sample grew up with a working mother, and 62% are married. The Spanish sample contains 617 individuals, where 61,85% are working, 12,6% part-time, on average with 10,9 years of schooling. The mean age of the Spanish women is 40,85 years and on average they have 1,31 children each. Lastly, as much as 77,13% of the Spanish sample grew up with a working mother, while 55,7% were married at the time of the survey.

Looking at the number of children and education in relation to employment in Table 9, we see that almost half of the employed Spaniards do not have children, compared to only one third of the Portuguese. Furthermore, we observe that a significantly larger share of the working female population in Spain have invested in higher education levels.

TABLE 9. Females 18-64, EVS 2008

ARE YOU EMPLOYED?

	NUMBER OF CHILDREN		EDUCATION LEVEL			
	<i>Portugal</i>	<i>Spain</i>	<i>Portugal</i>	<i>Spain</i>		
YES	0	27%	46%	Pre- or primary	42%	15%
	1	29%	20%	Lower and upper secondary	40%	40%
	2	32%	25%	Higher education	18%	45%
	3	7%	5%			
	4+	5%	3%			
NO	0	22%	31%	Pre- or primary	64%	37%
	1	22%	17%	Lower and upper secondary	29%	38%
	2	34%	28%	Higher education	7%	25%
	3	13%	18%			
	4+	9%	6%			

3.2. THE MODEL

The first model that is studied in this paper is

$$female\ working = f(children, working\ mother, married, attitudes, years\ of\ schooling, age, age^2)$$

The variable *age* and *age*² is centered, by subtracting the mean in order to avoid multicollinearity. This problem often occurs when adding the raw square of a variable in the regression. Moreover, *age*² is included in the model because we typically assume that the effect of age on the probability of a woman working wears off as she gets older. One reason for this may be health problems that arise with age which forces individuals to exit the labor force before reaching the retirement age.

The dependent variable *female working* is women between 18-64 years old that are actively participating in the labor market. Furthermore, the model contains four dummy variables: *children*, *working mother*, *attitudes* and *married*. The variable *children* is equal to 1 if the woman has children, and 0 otherwise; the variable *working mother* is 1 if the woman grew up with a working mother, and 0 otherwise; the variable *married* is 1 if the woman is married,

and 0 otherwise; and lastly, the variable *attitudes* is 1 if the attitudes towards working women are negative, and 0 otherwise. The dummy variable *attitudes* is measured by combining two value statements from the survey (i) “A pre-school child is likely to suffer if his or her mother works” and (ii) “Being a housewife is just as fulfilling as working for pay”, where the registered answers ranges from *strongly agree* to *strongly disagree*. Therefore, the dummy variable *attitudes* is 1 if the individual answered *strongly agree* or *agree*, and 0 otherwise. Lastly, the model includes the variable *years of schooling*, which ranges from *no education attainment* to *tertiary education attainment*. For the Portuguese sample the basic schooling is nine years, while ten for the Spanish; secondary education is three years in Portugal, and two in Spain; both countries have a four year *Licenciatura*, which is equivalent to a Bachelor degree ever since the Bologna Process of 1999; and lastly two or more years of education for Master and PhD. The objective is to test whether these factors are significant in explaining the probability of a woman working.

TABLE 10. Correlations Portugal

	<i>age</i>	<i>age</i> ²	<i>married</i>	<i>years of schooling</i>	<i>children</i>	<i>working mother</i>	<i>attitudes</i>
<i>age</i>	1.0000						
<i>age</i> ²	-0.1118*	1.0000					
<i>married</i>	0.1724*	-0.1705*	1.0000				
<i>years of schooling</i>	-0.3391*	-0.0877*	-0.0844*	1.0000			
<i>children</i>	0.3416*	-0.2704*	0.3841*	-0.2385*	1.0000		
<i>working mother</i>	-0.0269	-0.0278	0.0355	0.0283	-0.0580	1.0000	
<i>attitudes</i>	0.0383	0.0292	0.0471	-0.1334*	0.0481	0.0225	1.0000

* $p < 0.05$

Before carrying on with the individual country regressions, it might be interesting to observe some correlations between the variables in the model. Most interesting in the Portuguese case (Table 10) might be that having children is negatively correlated with years of schooling, implying that the more education a woman has, the less likely she is to have children. Moreover, to some extent surprisingly, there is a negative, yet weak, correlation between growing up with a working mother and having children. This could be surprising because one might consider that an individual, who grew up with a mother that handled the combination of

children and working, would be positive towards the idea. Lastly, there is a strong positive relationship between being married and having children, which implies that most of the mothers in the sample are indeed married.

We observe similar results for the correlations in the Spanish sample (Table 11). However, there is a weak, yet negative, correlation between conservative attitudes towards gender roles and growing up with a working mother. This relationship is anticipated, since we would expect females who grew up in an environment with a working mother to be affirmative of changing gender roles. Furthermore, contrary to the Portuguese sample, growing up with a working mother is positively, although weakly correlated with having children, which is something to be expected.

TABLE 11. Correlations Spain

	<i>age</i>	<i>age</i> ²	<i>married</i>	<i>years of schooling</i>	<i>children</i>	<i>working mother</i>	<i>attitudes</i>
<i>age</i>	1.0000						
<i>age</i> ²	0.1523*	1.0000					
<i>married</i>	0.2561*	-0.0918*	1.0000				
<i>years of schooling</i>	-0.3811*	-0.2886*	-0.1122*	1.0000			
<i>children</i>	0.4452*	-0.0946*	0.5019*	-0.2289*	1.0000		
<i>working mother</i>	-0.0021	-0.0739**	0.0493	0.0832*	0.0039	1.0000	
<i>attitudes</i>	0.0470	0.0726**	0.1277*	-0.1559*	0.1590*	-0.0868*	1.0000

* $p < 0.05$; ** $p < 0.1$

In the second part of the study, we will analyze the cross-country difference in female employment levels, and in order to do so, the following model is applied

$$female\ working = f(children, working\ mother, married, attitudes, years\ of\ schooling, country, country \times education, country \times working\ mother, country \times married, age, age^2)$$

The additional dummy variable in the model, *country*, is 1 if the individual is Portuguese, and 0 otherwise. This dummy is also introduced as three interactions in the model, *country* × *education*, *country* × *working mother* and *country* × *married*. Interaction terms are included in regression models in order to infer how the effect of one independent variable on

the dependent variable is determined by the magnitude of another independent variable (Norton et al., 2004). In this particular study *country*×*education* is included in order to deduce how women in the two countries act depending on education level. The second interaction term, *country*×*working mother*, measures the effect of growing up with a working mother on the female employment difference between the two countries. And lastly, *country*×*married* is introduced to test to which degree being married affects the female employment in the two countries. The objective of this model is to test whether these variables are significant in explaining the *cross-country* differences between Spain and Portugal in female employment levels.

3.3. PROBIT AND LOGIT MODELS

In this study there are two probable outcomes of the dependent variable: *working* or *not working*. In order to explain the relationship between the dependent and independent variables, the binary choice models *probit* and *logit* are applied to the data (Dougherty, 2001).

3.3.1. Binary Outcome Models

Binary choice models, are models where the outcome is assigned a value of 1 if the event occurs and 0 if it does not occur (Stock and Watson, 2011). In these types of models, the binary dependent variable, also referred to as a Bernoulli variable, *female working*, y , is a random variable that represents the propensity to participate in the labor force. In other words the model estimates the probability, through the expectation of y , that $y = 1$ as a function of the independent variables (Liao, 1994)

$$E(y|X) = pr(y = 1|X)$$

with use of the response probability

$$p = pr[y = 1|X] = F(X'\beta) = p(X)$$

where X is a $1 \times K$ vector of explanatory variables in our sample, and β is a $K \times 1$ matrix (Wooldridge, 2010). There are several types of functional forms that can be used with three types of models depending on the functional form of $F(X'\beta)$ being the most often used: the linear probability model; the logit model; and the probit model.

The regression model, also called the linear probability model, looks like

$$F(X'\beta) = X'\beta$$

and in this case, the probability of $y = 1$ is assumed to be a linear function of a set of explanatory variables

$$p = \text{pr}[y = 1|X] = X'\beta$$

where β is the change in the probability of success, i.e. $y = 1$, given a one-unit increase in X . For every X the distance between the two outcomes and the regression line changes, and thus the error term is not independent of X (Dougherty, 2001). Therefore, because of the binary nature of the dependent variable, the error term is heteroscedastic (Stock and Watson, 2011), and the estimates by ordinary least squares are inefficient (Liao, 1994). Nevertheless, the major issue with this regression is that the predicted probabilities will not be limited between 0 and 1 for extreme values of X , since there is no restriction on $X'\beta$ to be between 0 and 1 (Stock and Watson, 2011, Liao, 1994). Therefore, an increase in X is predicted to change the probability of $y = 1$, regardless of the initial value of X (Wooldridge, 2010). For this reason, the linear probability model is not usually used when dealing with binary outcomes. In fact, when working with Bernoulli dependent variables we require a *nonlinear* functional form for the probability, such as in the *logit* or *probit* regression models (Stock and Watson, 2011).

Both of the aforementioned models use cumulative probability distribution functions, producing probabilities between 0 and 1, and the main difference between them is the assumption on the distribution of the error terms (Wooldridge, 2010). The estimation results of the models are similar, and historically, the main motivation for choosing one rather than the other was that the logit model could be computed faster. However, with the use of computers, the choice has become a decision based on preferences and tastes of the researcher.

The logit model uses a cumulative *logistic* distribution function

$$F(X'\beta) = \Lambda(X'\beta) = \frac{1}{1 + e^{-(X'\beta)}}$$

$$f'(X'\beta) = \frac{e^{-(X'\beta)}}{(1 + e^{-(X'\beta)})^2}$$

and therefore the predicted probability is

$$\text{Pr}(y = 1|X) = \frac{1}{1 + e^{-(X'\beta)}}$$

which is limited between 0 and 1. As $X'\beta$ tends to infinity, $e^{-X'\beta}$ tends to 0 and p has an upper limit of 1 (Dougherty, 2001). Conversely, as $X'\beta$ tends to minus infinity, $e^{-X'\beta}$ tends to

infinity, so p has a lower limit of 0.

The probit model, however, uses a *standard normal* cumulative distribution function

$$F(X'\beta) = \Phi(X'\beta) = \int_{-\infty}^{X'\beta} \Phi(t)dt$$

$$f'(X'\beta) = (2\pi)^{-1/2} e^{\left(\frac{-(X'\beta)^2}{2}\right)}$$

where Φ is the *standard normal* cumulative distribution function. The predicted probability therefore becomes

$$\Pr(y = 1 | X) = \Phi(X'\beta)$$

being limited between 0 and 1. The coefficient β in both models represents the change in the z-value associated with a unit change in X . That means that if the change is positive it increases the probability that $y = 1$ (Stock and Watson, 2011). The standard normal cumulative and the cumulative logistic distribution function are quite similar, except in the tails, and therefore their predicted probabilities are almost identical (Liao, 1994, Greene, 2011).

3.3.2. Maximum Likelihood Estimation

Binary choice models are fitted using maximum likelihood estimation (Liao, 1994), which produces efficient, i.e. minimum variance, estimators that are consistent and normally distributed in large samples (Stock and Watson, 2011). The *likelihood function* is the joint probability distribution of the data, treated as a function of the unknown coefficients (Stock and Watson, 2011). The *maximum likelihood estimator* (MLE) of the unknown coefficients, is therefore estimated by the values of the coefficients that maximize the likelihood function (Stock and Watson, 2011). This is indeed the joint probability distribution, and consequently the MLE chooses the values that maximize the probability of drawing the data that are actually observed. Because of this, we can say that the MLEs are the values that most likely produced the data (Stock and Watson, 2011).

If we consider y as a Bernoulli random variable, either equal to 0 or 1, the only unknown parameter that needs to be estimated is the probability that $y = 1$, which naturally is the mean of y (Stock and Watson, 2011). In order to obtain the MLE, it is necessary to have an expression for the likelihood function, which in turn requires an expression for the joint probability distribution of the data. The joint probability distribution of the two observations

of y is

$$pr(y_1 = 0, y_2 = 1) = pr(y_1 = 0)pr(y_2 = 1)$$

The Bernoulli distribution is summarized in the formula

$$pr(Y = y) = p^y(1 - p)^{1-y}$$

so, for $y = 0$, the probability is

$$pr(y = 0) = p^0(1 - p)^{1-0} = 1 - p$$

and similarly for $y = 1$

$$pr(y = 1) = p^1(1 - p)^{1-1} = p$$

Thus, the joint probability distribution of y_1 and y_2 is

$$\begin{aligned} pr(y_1 = 0, y_2 = 1) &= [p^0(1 - p)^{1-0}] \times [p^1(1 - p)^{1-1}] \\ &= p^{0+1}(1 - p)^{2-1-0} \\ &= p(1 - p) \end{aligned}$$

hence, the likelihood function is

$$f(p; y_1, y_2) = p(1 - p)$$

As previously stated, the MLE of \hat{p} is the value of p that maximizes this function. The MLE \hat{p} of the Bernoulli probability p is the sample average, in other words $\hat{p} = \bar{y}$ (Stock and Watson, 2011).

For the probit model, where the probability of $y = 1$ is $Pr(y = 1|X) = \Phi(X'\beta)$, the joint probability distribution is

$$pr(y = 0, 1|X) = p^y(1 - p)^{1-y}$$

It is common to consider the logarithm of the likelihood. The log-likelihood function is therefore

$$\ln[f_{probit}(\beta; y|x)] = \sum_{i=1}^n y \ln[\Phi(X'\beta)] + \sum_{i=1}^n (1 - y) \ln[1 - \Phi(X'\beta)]$$

and the MLE for the probit model maximizes this function.

Equivalently the MLE for the logit model is calculated by maximizing the log-likelihood function

$$\ln[f_{logit}(\beta; y|x)] = \sum_{i=1}^n y \ln[(1 + e^{-(X'\beta)})^{-1}] + \sum_{i=1}^n (1 - y) \ln[1 - (1 + e^{-(X'\beta)})^{-1}]$$

3.3.3. Goodness of Fit Measures

There are several ways to measure the fit, the percent of correctly predicted values, of models with binary dependent variables. Three typically used measures are the so-called *fraction correctly predicted*, the *pseudo-R²* and *Akaike's information criterion (AIC)*. The former uses the following rule: If the predicted probability is greater than 0,5 for $y = 1$, or if $y = 0$ and the predicted probability is less than 0,5, then we say that y is correctly predicted (Stock and Watson, 2011). The *fraction correctly predicted* is the fraction of the n observations of y that are correctly predicted.

The *pseudo-R²*, also called the McFadden R-squared, however, measures the proportion by which the unrestricted log-likelihood, L_{ur} , is smaller, in absolute size, than restricted version, L_r (Dougherty, 2001). Thus, the fit of the model is measured using the log-likelihood function in the following way

$$R^2 = 1 - L_{ur}/L_r$$

which compares the unrestricted log-likelihood L_{ur} for the model we are estimating and the restricted log-likelihood L_r with only an intercept (Wooldridge, 2010). The log-likelihood for a binary response model is always negative, $|L_{ur}| \leq |L_r|$, and therefore the *pseudo-R²* always lies between zero and one (Wooldridge, 2010).

Finally, the *AIC* is also based on the log-likelihood of the model

$$AIC = -2 \times L + 2k$$

where L is again the log-likelihood, and k is the number of parameters in the model. The fit of the model is measured by information criteria, stating that the model with the lowest AIC is the model with the best fit.

3.3.4. Marginal Effects and Odds-Ratios: Interpretation of The Coefficients

In a linear model we interpret the estimated coefficients as the effect on the dependent variable, y , of a change in the independent variable, x_i , while holding everything else constant. However, when y is binary, as in our case, the expected change in y stemming from a change in x is the change in the likelihood that $y = 1$ (Stock and Watson, 2011). In other words, an increase in x makes the outcome of $y = 1$ more or less probable. After running the model, we can interpret the sign of the coefficient, in order to confirm if the change in x has positive or negative effect on the probability of $y = 1$, but not the actual magnitude of the

effect (Wooldridge, 2010). To interpret the coefficients of the two models we analyze the marginal effects, $\frac{\partial p}{\partial x_j}$. The reason for this is that scales of the coefficients vary across the different models (Greene, 2011):

$$\begin{aligned}\hat{\beta}_{OLS} &\approx 0.4\beta_{probit} \\ \hat{\beta}_{OLS} &\approx 0.25\beta_{logit} \\ \hat{\beta}_{logit} &\approx 1.6\hat{\beta}_{probit}\end{aligned}$$

The marginal effects reflect the change in the probability of $y = 1$ given as one-unit change in an independent variable x_j . There are two ways of estimating the marginal effects: marginal effect at the mean value of the explanatory variable and average marginal effects (Dougherty, 2001). The marginal effects estimated for the average person in the sample \bar{x} is calculated as

$$\frac{\partial p}{\partial x_j} = F'(X'\beta)\beta_j$$

for continuous explanatory variables (Wooldridge, 2010). The marginal effects depend on x_j , so we need to estimate the marginal effects at a specific value of X , typically the means. The estimated coefficients and marginal effects have the same signs because $F'(X'\beta) > 0$. For a binary explanatory variable, and other discrete variables, however, the average is not necessarily a possible outcome of the variable. Therefore, we estimate the partial effect from changing x_K from 0 to 1 like this

$$F(\beta_1 + \beta_2x_2 + \dots + \beta_{K-1}x_{K-1} + \beta_K) - F(\beta_1 + \beta_2x_2 + \dots + \beta_{K-1}x_{K-1})$$

depending on all other values of x_j (Wooldridge, 2010).

The marginal effects at the mean for the logit model is given by the derivative

$$\frac{\partial p}{\partial x_j} = \frac{dp}{dX'\beta} \times \frac{\partial X'\beta}{\partial x_j} = \frac{e^{-(X'\beta)}}{(1 + e^{-(X'\beta)})^2} \beta_j$$

And for the probit model

$$\frac{\partial p}{\partial x_j} = \frac{dp}{dX'\beta} \times \frac{\partial X'\beta}{\partial x_j} = \Phi'(X'\beta) = \left(\frac{1}{\sqrt{2\pi}} e^{-\frac{(X'\beta)^2}{2}} \right) \beta_j$$

where Φ is the probability density function of a standard normal variable.

An issue with this approach is that there might not be such a person in the sample, i.e. the average of the explanatory variables may not represent a specific unit in the population

(Wooldridge, 2010). Therefore we can also estimate the marginal effects as the average of the partial marginal effect in this manner for continuous variables

$$\frac{\partial p}{\partial x_j} = \frac{\sum F'(X'\beta)}{n} \beta_j$$

and in this way for binary random variables

$$\frac{\partial p}{\partial x_j} = \frac{\sum F'(F(\beta_1 + \beta_2 x_2 + \dots + \beta_{K-1} x_{K-1} + \beta_K) - F(\beta_1 + \beta_2 x_2 + \dots + \beta_{K-1} x_{K-1}))}{n}$$

In practice, the two ways to estimate marginal effects produce almost identical results most of the time (Wooldridge, 2010).

Moreover, for the logit model odds-ratio, the relative risk of $y = 1$ occurring, can also be used when interpreting the results. It measures the association of exposure of one variable on the outcome of the model (Norton et al., 2004). The odds are the ratio of a probability to one minus the probability

$$p = \frac{1}{1 + e^{-(X'\beta)}}$$

$$odds = \frac{p}{1 - p} = \frac{1}{e^{-(X'\beta)}} = e^{(X'\beta)} \in [0, \infty)$$

$$\ln \frac{p}{1 - p} = X'\beta$$

The odds-ratio is the ratio of odds for two different observations, $y = 1$ and $y = 0$, that differ only in the value of one explanatory variable (Norton et al., 2004). It is denoted $p/(1 - p)$ and measures the probability that $y = 1$ relative to the probability that $y = 0$

$$odds - ratio = \frac{p(y = 1)}{1 - p(y = 1)} = e^{\beta y=1}$$

However, the aforementioned results cannot be applied for interaction dummies, such as *country*×*education*, which is included in the cross-country regression of this study. The full interaction effect is the cross-partial derivative of the expected outcome of y (Norton et al., 2004). For an interaction of one continuous variable and one dummy variable, the interaction effect is the cross derivative, for the logit model

$$\frac{\partial^2 F(X'\beta)}{\partial x_1 \partial x_2} = (\beta_1 + \beta_2)(F\{(\beta_1 + \beta_2)x_1 + \beta_2 + X\beta\} \times (1 - F\{(\beta_1 + \beta_2)x_1 + \beta_2 + X\beta\})) - \beta_1[F(\beta_1 x_1 + X\beta)\{1 - F(\beta_1 x_1 + X\beta)\}]$$

and for the probit model

$$\frac{\Delta \frac{\partial F(X'\beta)}{\partial x_1}}{\Delta x_2} = (\beta_1 + \beta_2) \Phi\{(\beta_1 + \beta_{12})x_1 + \beta_2 + X'\beta\} - \beta_1 \Phi(\beta_1 x_1 + X'\beta)$$

For the logit model, with an interaction of two dummy variables, the interaction effect is the discrete double difference

$$\frac{\Delta^2 F(X'\beta)}{\Delta x_1 \Delta x_2} = \frac{1}{1 + e^{-(\beta_1 + \beta_2 + \beta_{12} + X'\beta)}} - \frac{1}{1 + e^{-(\beta_1 + X'\beta)}} - \frac{1}{1 + e^{-(\beta_2 + X'\beta)}} + \frac{1}{1 + e^{-(X'\beta)}}$$

and for the probit model

$$\frac{\Delta^2 F(X'\beta)}{\Delta x_1 \Delta x_2} = \Phi(\beta_1 + \beta_2 + \beta_{12} + X'\beta) - \Phi(\beta_1 + X'\beta) - \Phi(\beta_2 + X'\beta) - \Phi(X'\beta)$$

Furthermore, calculating the odds-ratios between two dummy interaction variables is done in the following manner

$$\text{Odds for } x_1 |_{x_2=1} = \frac{e^{(\beta_1 + \beta_2 + \beta_{12} + X'\beta)}}{e^{(\beta_2 + X'\beta)}}$$

$$\text{Odds for } x_1 |_{x_2=0} = \frac{e^{(\beta_1 + X'\beta)}}{e^{(X'\beta)}}$$

$$\text{Odds - ratio for } x_1 \text{ and } x_2 = e^{(\beta_{12})}$$

4. RESULTS

This section deals with the results of the regressions using both the probit and the logit models. First, Portugal and Spain will be analyzed separately, in order to see how the variables *children*, *working mother*, *married*, *attitudes*, *years of schooling*, and *age* affect the female employment of the individual countries. Thereupon, the two countries are analyzed together, following a cross-country regression including the variables *country*, *country*×*education*, *country*×*working mother*, and *country*×*married*. The results from the individual country regressions with the two models are exhibited in Table 12 for Portugal, and Table 13 for Spain. Moreover, the results derived from the cross-country regression can be found in Table 14. Further detailed outputs of all the regressions are placed in the Appendix.

4.1. PORTUGAL

Regression results for Portugal using the probit model show that age, age-squared, being married, having children and negative attitudes towards changing gender roles all have a negative effect on the probability of a female working. Higher education and growing up with a working mother, however, affect the probability positively. Furthermore, the variables age, age-squared, years of schooling and attitudes are statistically significant, meaning that their estimated p-value is lower than the chosen threshold of 5% significance level, to explain the employment probability. Being married, with a significance level of 0.924, growing up with a working mother, 0.168, and having children, 0.184, however, are not statistically significant in this model. Moreover, the R-squared, the percent of correctly predicted values for the model is only 15%, however the *fraction correctly predicted* is 73%, just some percentage points below the logit regression. All these results coincide with the results using the logit regression of the model.

TABLE 12. Regression Results For Portugal

<i>Female Working</i>	PROBIT		LOGIT	
	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>
<i>Age</i>	-0.011* (.0018)	-0.009* (.0014)	-0.011* (.0019)	-0.009* (.0013)
<i>Age-squared</i>	-0.0007* (.0001)	-0.0006* (.0001)	-0.0008* (.0001)	-0.0006* (.0001)
<i>Married</i>	-0.004 (.0469)	-0.003 (.0398)	-0.007 (.0486)	-0.006 (.0397)
<i>Years of Schooling</i>	0.019* (.0073)	0.016* (.0061)	0.020* (.0077)	0.016* (.0062)
<i>Children</i>	-0.079 (.0600)	-0.067 (.0508)	-0.081 (.0637)	-0.066 (.0519)
<i>Working Mother</i>	0.077 (.0564)	0.066 (.0477)	0.081 (.0574)	0.066 (.0468)
<i>Attitudes</i>	-0.112* (.0449)	-0.095* (.0376)	-0.118* (.0463)	-0.097* (.0372)
<i>Pseudo R-squared</i>	0.150		0.150	
<i>Correctly Predicted</i>	73,43%		73.76%	

* $p < 0.05$

As discussed in section 3, the marginal effects at the mean and the average marginal effects should be used in order to interpret the quantitative effect of each variable on the probability of a female working. Foremost, we observe that the signs of the marginal effects are the same as the signs of the estimated coefficients for both models, and indeed likewise across models. Furthermore, the magnitude of the marginal effect at the mean and the average marginal effect are also similar. Both models have same interpretation of the marginal effects.

Foremost, it is noteworthy that the variable with the largest impact, in terms of magnitude, on the probability of a female working is negative attitudes towards changing gender roles, weighting negatively. The variable with the largest *positive* impact on the probability is growing up with a working mother. The former coincides with previous research, regarding southern culture and how attitudes in the society shape the behavior of women. The latter is also interesting because it further verifies this assumption: that when a woman is exposed to the idea that a female can, or even should, work, she is more prompt to participate in the labor market.

The result of the regression using the logit model implies that being married reduces the probability of a female working by 0,4%, using the marginal effects at the mean, while 0,3% of the mean. In fact, the average rate of working in our sample is 61,7%, and the average marriage rate is 62%, signifying that a decrease of 0,4% in employment due to marriage is not a very strong effect. Moreover, results from the regressions show that having children reduces the probability of a woman working by 7,9%, and 6,7%, when it is compared to not having children. As the average fertility rate in our sample is 1,56, this result may suggest that the average employment of 61,7% could be considerably affected by fertility. Additionally, negative attitudes towards changing gender roles reduces the probability of working by 11,2% and 9,5%, in comparison to if the attitudes were different, suggesting that the average working rate of our sample is to a large extent caused by attitudes towards the female role in society. However, our results also show that, in Portugal, where our sample on average attains 10 years of schooling, each additional year only increases the probability of a woman working by 1,9% at the mean and 1,6% of the mean, which does not greatly affect the 61,7% employment rate. Lastly, 70,5% of the female population in this Portuguese sample grew up with a working mother, and results show that having done so the probability of participating in the labor market increases with 7,7% and 6,6%, compared to not growing up with a

working mother, which we can consider as a strong effect relative to the employment rate of 61,7%.

4.2. SPAIN

Turning to the regressions of the Spanish sample, the findings in this study show that the variables with a negative effect on the probability of the woman working are age, age-squared, being married, having children, growing up with a working mother, and negative attitudes towards changing gender roles. The most surprising observation might be that growing up with a working mother should have a negative influence on this probability. As mentioned when analyzing the Portuguese sample, it would indeed be more reasonable that growing up in an environment where the mother works will form positive perceptions of a woman working. The only variable with positive effect is years of schooling. Using the logit regression results, at a threshold of 5% significance level, the statistically significant variables of the model are age, age-squared, being married, years of schooling, having children, and negative attitudes. Growing up with a working mother, 0,121, is not statistically significant, and not even for a 10% significance level. The results of the specification tests show that the *pseudo-R²* is 15,3% for both the probit and logit regression, and the *fraction correctly predicted* values is 70,7%.

To interpret the magnitude effect of the coefficients, we again look at the marginal effects. In the Spanish sample, the variable with the greatest impact on the probability of a woman working is being married. If we consider the results for the regression of the probit model, we find that being married increases the probability of working by 18,4% of the average person in the sample, and 15,6% of the mean of the total observations, compared to not being married. In fact, only 55,7% in our Spanish sample are married, so an increase in marriage rates would have substantial impact on the 61,85% employment rate. Moreover, an additional year of schooling, relative to the average of almost 11 years, increases the probability of working by 1,6%, and 1,3% on average, which in practice would not greatly affect the current employment rate of the sample. On the other hand, children reduce the likelihood of a woman working with as much as 11,4% at the mean, and 9,6% of the mean of the observations, compared to not having children. Indeed the Spanish population in our sample has a quite low fertility rate of 1,31, so having a child may affect the employment rate. Additionally, growing up with a working mother which 77,13% of the sample did, reduces the probability of

working with 14,4% and 12,2%, compared to not having a working mother, which seems to be a strong reason for the current employment rate of the sample. Lastly, negative attitudes towards modern gender roles, affects the probability negatively with 15,2% and 12,8%, compared with other attitudes.

TABLE 13. Regression Results For Spain

<i>Female Working</i>	PROBIT		LOGIT	
	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>
<i>Age</i>	-0.004* (.0019)	-0.003* (.0016)	-0.004* (.0020)	-0.003* (.0016)
<i>Age-squared</i>	-0.000* (.0001)	-0.0004* (.0001)	-0.000* (.0001)	-0.000* (.0001)
<i>Married</i>	-0.184* (.0486)	-0.156* (.0399)	-0.190* (.0502)	-0.156* (.0397)
<i>Years of Schooling</i>	0.016* (.0054)	0.013* (.0045)	0.016* (.0056)	0.013* (.0045)
<i>Children</i>	-0.114* (.0557)	-0.096* (.0468)	-0.115* (.0579)	-0.095* (.0473)
<i>Working Mother</i>	-0.144 (.0929)	-0.122 (.0783)	-0.144 (.0963)	-0.119 (.0788)
<i>Attitudes</i>	-0.152* (.0548)	-0.128* (.0456)	-0.155* (.0564)	-0.128* (.0452)
<i>Pseudo R-squared</i>	0.153		0.153	
<i>Correctly Predicted</i>	70.70%		70.70%	

* $p < 0.05$

4.3. CROSS-COUNTRY ANALYSIS

In this part of the study, the main objective is to explain the cross-country difference in female participation levels, and the dummy variable *country* is included in the model, both in an individual way and as interaction terms, *country*×*education*, *country*×*working mother*, and *country*×*married*. The interaction terms are included in order to derive how much the effect of education, growing up with a working mother, and marital status on the probability to work differs between the women in Spain and Portugal. If these terms produce statistically

significant results, these factors also affect the probability of a woman working, and thus may explain some of the cross-country difference.

The results of the regression show that age, age-squared, being married, years of schooling, having children, attitudes, country, *country*×*working mother* and *country*×*married* are all significant variables to explain the probability of a woman working in Spain and Portugal. However, the results also show that growing up with a working mother, as well as the interaction effect *country*×*education* are in fact not significant to explain this probability. The variables that affect the probability of working negatively are age, being married, having children, growing up with a working mother, negative attitudes towards changing gender roles, as well as being Portuguese. While on the other hand, an additional year of schooling, as well as all the interaction terms makes the probability of the woman working greater. Examining the magnitude effects the results show that, out of all the variables, being Portuguese is the variable with the largest, and also negative, impact on the probability of working.

When adding interaction terms to a regression, the interpretation of the effects changes. *country*×*education* refers to the added effect of an additional year of schooling for a Portuguese woman compared to a Spanish one, while years of schooling now specifies the effect of an additional year of schooling for the Spanish. Likewise, the interaction term *country*×*working mother* refers to the effect of growing up with a working mother for the Portuguese females compared to the Spanish, while the variable working mother indicates the effect for the Spanish women. Lastly, *country*×*married* shows the effect on the probability of working for married women in Portugal compared to the Spanish, while the variable married predicts the probability for Spanish women. It is indeed these terms that ultimately will be of most interest for this part of the analysis.

By using these specifications the intensity of the effects from the variables can be analyzed relative to the probability of females working. The variable *country*×*education*, although not significant, shows that a Portuguese woman who attains one more year of schooling, on average has a 1,1% higher probability of working than Spanish women, while the Spanish women increase their probability of working with 1% with each new year of education. When looking at the country averages, with the Portuguese having 10 years of schooling on average and Spain having almost 11, and at the same time taking the employment rates of the

sample into account, where Spain has a slightly higher rate than Portugal, this result makes sense. Since Spain exhibits higher rates on both variables, it is not surprising that Portugal could improve more with the same increase.

TABLE 14. Cross-Country Regression Results

<i>Female Working</i>	PROBIT		LOGIT	
	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>	<i>Marginal effects at the mean</i>	<i>Average marginal effects</i>
<i>Age</i>	-0.008* (.0013)	-0.007* (.0010)	-0.008* (.0013)	-0.006* (.0010)
<i>Age-squared</i>	-0.0006* (.0001)	-0.0005* (.00008)	-0.0006* (.0001)	-0.0005* (.00008)
<i>Married</i>	-0.186* (.0462)	-0.159* (.0387)	-0.197* (.0484)	-0.162* (.0392)
<i>Years of Schooling</i>	0.012* (.0053)	0.010* (.0045)	0.013* (.0055)	0.010* (.0045)
<i>Children</i>	-0.087* (.0405)	-0.075* (.0344)	-0.090* (.0424)	-0.074* (.0349)
<i>Working Mother</i>	-0.142 (.0942)	-0.121 (.0802)	-0.144 (.0984)	-0.119 (.0811)
<i>Attitudes</i>	-0.129* (.0345)	-0.110* (.0290)	-0.134* (.0354)	-0.111* (.0286)
<i>Country</i>	-0.371* (.1399)	-0.317* (.1185)	-0.378* (.1457)	-0.312* (.1195)
<i>Country*Education</i>	0.010 (.0084)	0.011 (.2835)	0.010 (.0090)	0.011 (.3486)
<i>Country*Working Mother</i>	0.220* (.1094)	0.170* (3.33)	0.225* (.1131)	0.168* (3.707)
<i>Country*Married</i>	0.180* (.0608)	0.128* (3.20)	0.187* (.0632)	0.126* (3.749)
<i>Pseudo R-squared</i>	0.146		0.146	
<i>Correctly Predicted</i>	71.65		71.73%	
<i>AIC</i>	1404.72		1404.13	

* $p < 0.05$

Moreover, the regression results for the interaction term *country*×*working mother* shows that the average change in the predicted conditional probability, i.e. the probability that a woman will work, if she grew up with a working mother, differs between Portugal and Spain by

17%, with the Portuguese sample having higher marginal effects on average. The probability of a Spanish woman working actually decreases with 12,1% if she grew up with a working mother. In fact, 70,5% of the female population in Portugal grew up with a working mother, while as many as 77,13% of the Spanish did. This might suggest a difference in perception of women's role, as one would expect the experience of having a working mother to positively affect a woman's future labor participation decision.

In addition, results for *country*×*married* shows that married portuguese women have 12,8% higher probability of working than the Spanish married women. In fact, being married decreases the probability of working with almost 16% in Spain. There are 6,3% more married women in Portugal than in Spain in our sample, so therefore it is interesting that the employment rates in Spain are higher, although only a little, than the Portuguese.

Nevertheless, the variable *country* indicates that, in our sample, being portuguese on average reduce the probability of working with as much as 31,7%, although the difference in rates between the two countries are not that large.

5. CONCLUSIONS

This study tries to explain why, according to official data, the employment of females aged 20-64 in Portugal is 9,4% higher when compared to Spain. This thesis finds three main factors that may explain this difference. Firstly, growing up with a working mother is an important factor to explain the probability of a woman deciding to participate in the labor force. In Portugal, the effect is clearly positive, while the Spanish results are puzzling: they exhibit a negative effect. In the cross-country analysis, we indeed find that the Portuguese women are more inclined to work if they grew up in a household with a working mother. In fact, in our sample 70,5% Portuguese and 77,13% Spanish women grew up under these conditions, which amounts to a 6,3% difference. These findings might be a consequence of cultural aspects, such as differences in attitudes. When the general opinion in the environment is contra females working, our results show that fewer Spanish women tend to engage in the labor market than in Portugal.

Secondly, being married seems to have a negative effect on the probability of working in both countries. In the Portuguese sample 62% are married, while only 55,7% are in the Spanish sample. Nevertheless, the actual effect stemming from this variable seems to be considerably larger in the Spanish sample. In fact, the cross-country results also show that this effect is slim in the Portuguese sample, compared to the Spanish.

Lastly, but maybe the most interesting findings are related with education levels. Official data shows that there are 14% more women in Spain with tertiary education, which is also reflected in our sample average of years of schooling. The Spanish seem to invest more in higher education than Portuguese, and our results show that this investment has positive impact in both countries, yet when analyzing the countries jointly we find that the effect is larger in Portugal than in Spain, although not much. One would expect that since Spanish women have higher educational attainment, there would be a greater demand for skilled Portuguese labor. However, due to the difference in industry characteristics in the two countries, as for instance the greater amount of large enterprises present in Spain, their labor market might demand more skilled workers than in Portugal.

5.1. LIMITATIONS

The main limitation for this study is the type of data used. Although the European Values Survey is a comprehensive survey, covering many European countries, a more appropriate survey would be, for instance, the EU-SILC. This micro data-set gathered from surveys all across Europe by Eurostat holds information about European households that is more suitable for an economic study, because of the nature of the data. With this survey, other variables could optionally be added to the model including those previous research has found to be important to determine the probability of a woman working, such as child-care benefits, or household income. Unfortunately, access to this data requires both time and bureaucracy, which a semester-long thesis study does not allow for.

Another substantial limitation of this thesis is the sample size of the data. Although a sample size of more than 1200 would be sufficient for some types of research, I argue that when doing a study on an entire population, or a comparison of two as in the case of this thesis, to explain differences, the data collected should be from a larger group of people to assure an

unbiased sample. Additionally, the public aggregate data available for the two countries through, for instance, Pordata and Eurostat do not coincide on important aspects, such as the percentages of the female population that is employed. Although this study tries to find cross-country differences that can explain the reason Portuguese women have a greater tendency to work than Spanish, this is in fact not true for the sample used for this study. Because of this, the findings of the main drivers behind female employment, and the differences between the Spain and Portugal, although true for this limited sample, may indeed not be relevant for the entire female population.

5.2. SUGGESTIONS FOR FURTHER RESEARCH

Despite the mentioned limitations, this study paves a way for future research on the cross-country difference in female employment between Portugal and Spain. A curious aspect that can be further studied is the possible effect of fertility, relating it to the maternity leaves and benefits of the two countries. Furthermore, part-time employment seems to be greater in Spain than in Portugal, making the employment disparity of the two countries more perplexing, since the general understanding is that this possibility should enable women to engage in the labor force, while still bearing children.

Furthermore, although this study focuses on the employment, it might be interesting to study reasons for unemployment through participation rates. Spanish women have caught up to the Portuguese with regards to female activity rates, and main driver behind this boost in levels could be analyzed.

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APPENDIX

A.1. GENERAL ATTITUDES

TABLE 1 EVS survey of national preferences regarding gender roles, 2008

	<i>“When jobs are scarce, men have more right to a job than women”</i>			<i>“A working mother can establish just as warm and secure a relationship with her children as a mother who does not work”</i>	
	Agree	Neither	Disagree	Strongly agree or agree	Strongly disagree or agree
Portugal	22,76	13,6	63,64	75,83	75,62
Spain	16,56	12,49	70,94	24,17	24,38

TABLE 2 EVS survey of national preferences regarding gender roles, 2008

	<i>“Having a job is the best way for a woman to be an independent person”</i>		<i>“Both husband and wife should contribute to household income”</i>	
	Strongly agree or agree	Strongly disagree or agree	Strongly agree or agree	Strongly disagree or agree
Portugal	83,87	16,13	94,82	5,18
Spain	86,38	13,62	87,55	12,45

FIGURE 1: *“A pre-school child is likely to suffer if his or her mother works”*

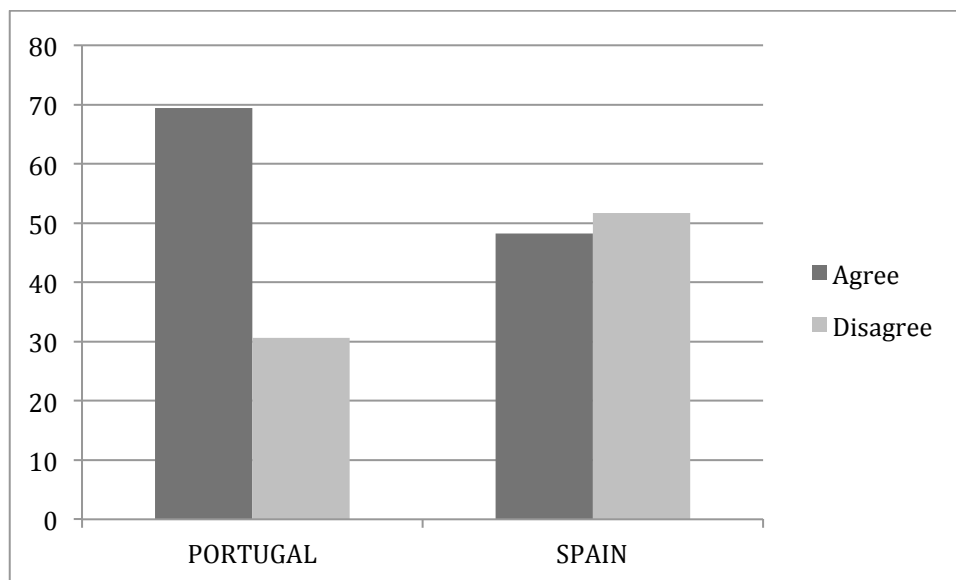


FIGURE 2: *“Being a housewife is just as fulfilling as working for pay”*

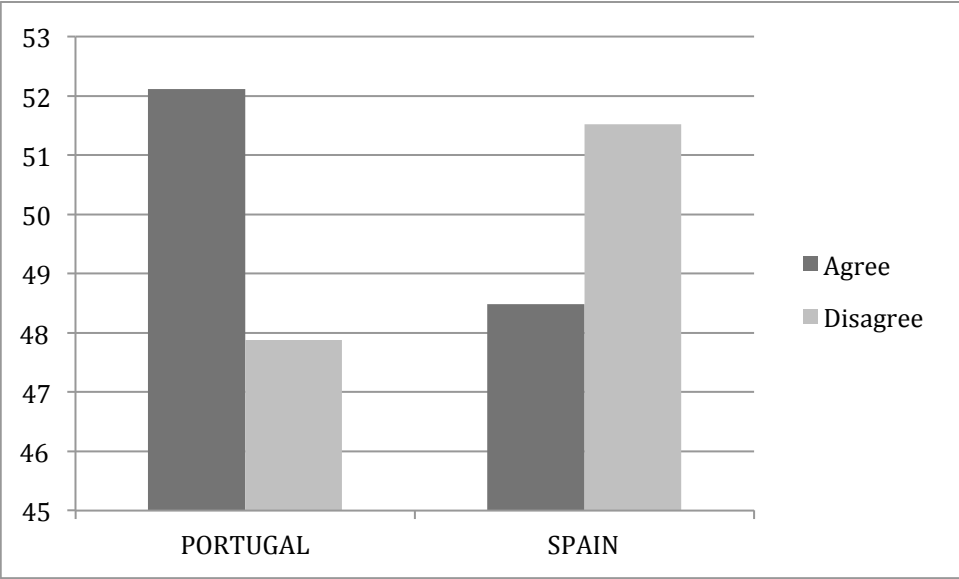


FIGURE 3: *“Do you think that a woman has to have children in order to be fulfilled?”*

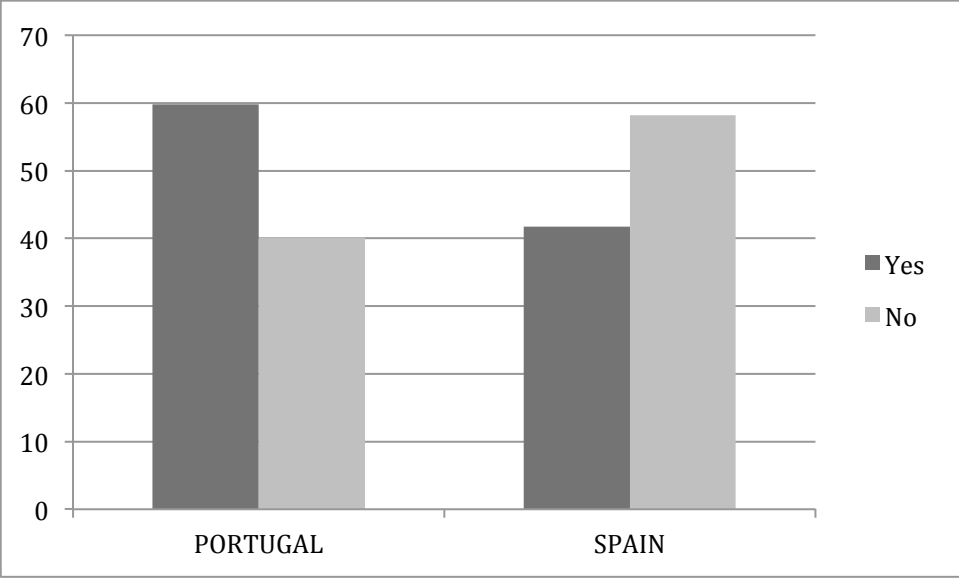


FIGURE 4: “A man has to have children in order to be fulfilled”

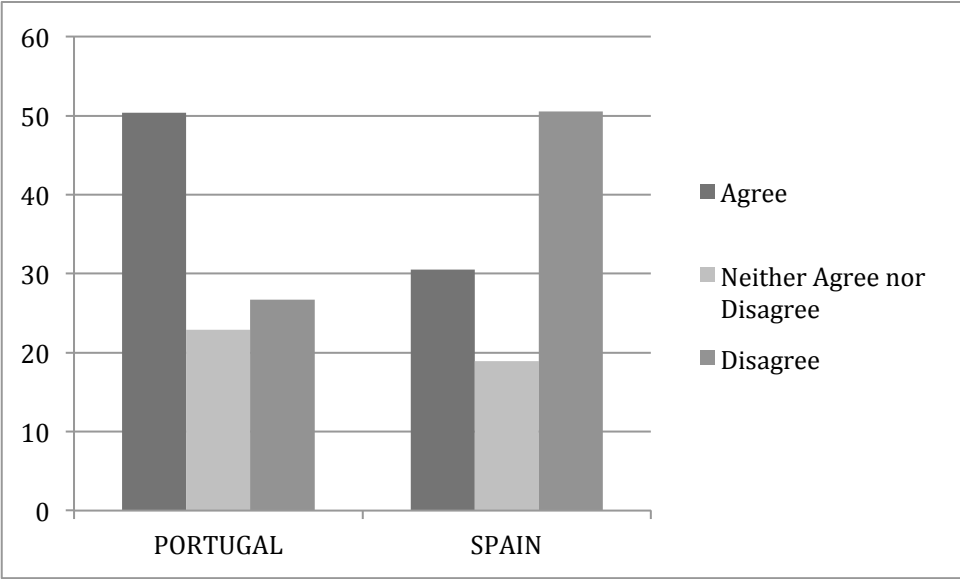
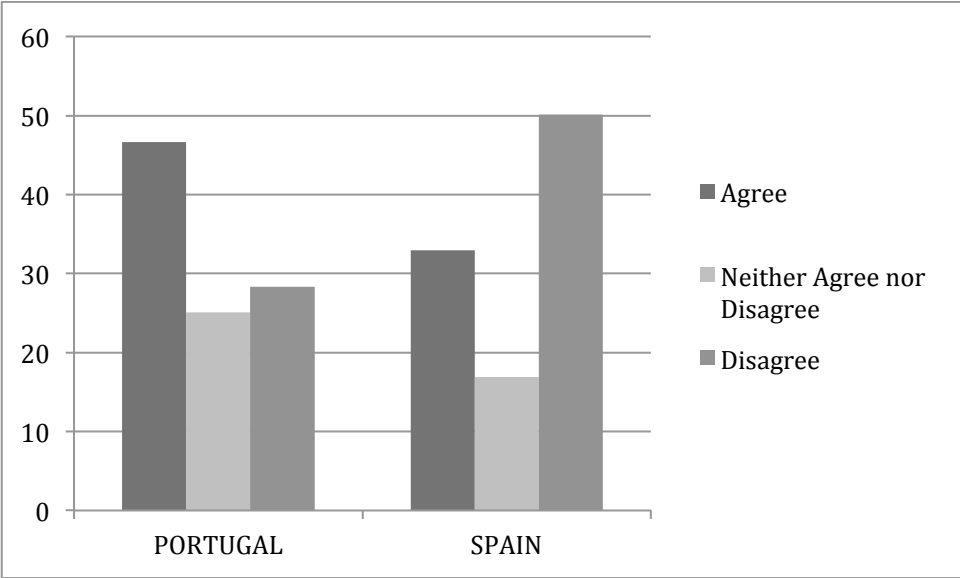


FIGURE 5: “It is a duty to society to have children”



A.2. STATA OUTPUTS

A.2.1. Portugal

OUTPUT 1: PROBIT AND LOGIT REGRESSION

	PROBIT			LOGIT		
	Coefficient	z	P> z	Coefficient	z	P> z
age	-0.030 (.0048)	-6.29	0.000	-0.050 (.0081)	-6.22	0.000
age ²	-0.002 (.0003)	-5.56	0.000	-0.003 (.0006)	-5.46	0.000
married	-0.011 (.1241)	-0.10	0.924	-0.033 (.2084)	-0.16	0.871
years of schooling	0.051 (.0193)	2.67	0.007	0.087 (.0333)	2.62	0.009
children	-0.210 (.1588)	-1.33	0.184	-0.348 (.2734)	-1.28	0.202
working mother	0.205 (.1491)	1.38	0.168	0.350 (.2465)	1.42	0.155
attitudes	-0.296 (.1186)	-2.50	0.013	-0.509 (.1987)	-2.56	0.010
constant	0.223 (.3041)	0.73	0.463	0.353 (.5179)	0.68	0.495
<i>pseudo r-squared</i>	0.150			0.150		
<i>correctly predicted</i>	73,43%			73.76%		

OUTPUT 2: MARGINAL EFFECTS AND ODDS-RATIOS

	PROBIT		LOGIT		Odds-ratios
	Marginal Effects		Marginal effects		
	<i>At the mean</i>	<i>On average</i>	<i>At the mean</i>	<i>On average</i>	
age	-0.011* (.0018)	-0.009* (.0014)	-0.011* (.0019)	-0.009* (.0013)	0.950* (.0077)
age ²	-0.0007* (.0001)	-0.0006* (.0001)	-0.0008* (.0001)	-0.0006* (.0001)	0.996* (.0006)
married	-0.004 (.0469)	-0.003 (.0398)	-0.007 (.0486)	-0.064 (.0397)	0.966 (.2014)
years of schooling	0.019* (.0073)	0.016* (.0061)	0.020* (.0077)	0.016* (.0062)	1.091* (.0363)
children	-0.079 (.0600)	-0.067 (.0508)	-0.081 (.0637)	-0.066 (.0519)	0.705 (.1929)
working mother	0.077 (.0564)	0.066 (.0477)	0.081 (.0574)	0.066 (.0468)	1.419 (.3500)
attitudes	-0.112* (.0449)	-0.095* (.0376)	-0.118* (.0463)	-0.097* (.0372)	0.600* (.1193)

* $p < 0.05$

A.2.2. Spain

OUTPUT 3: PROBIT AND LOGIT REGRESSION

	PROBIT			LOGIT		
	Coefficient	z	P> z	Coefficient	z	P> z
age	-0.012 (.0052)	-2.33	0.020	-0.020 (.0080)	-2.33	0.020
age ²	-0.001 (.0003)	-4.18	0.000	-0.002 (.0006)	4.00	0.000
married	-0.492 (.1296)	-3.80	0.000	0.827 (.2183)	-3.79	0.000
years of schooling	0.042 (.0145)	2.94	0.003	0.070 (.0243)	2.90	0.004
children	-0.304 (.1486)	-2.05	0.041	-0.502 (.2521)	-1.99	0.046
working mother	-0.384 (.2479)	-1.55	0.121	-0.628 (.4183)	-1.50	0.133
attitudes	-0.405 (.1461)	-2.77	0.006	-0.675 (.2443)	-2.77	0.006
constant	1.022 (.3230)	3.17	0.002	1.687 (.5485)	3.08	0.002
<i>pseudo r-squared</i>	0.153			0.153		
<i>correctly predicted</i>	70.70%			70.70%		

OUTPUT 4: MARGINAL EFFECTS AND ODDS-RATIOS

	PROBIT		LOGIT		Odds-ratios
	Marginal Effects		Marginal effects		
	<i>At the mean</i>	<i>On average</i>	<i>At the mean</i>	<i>On average</i>	
age	-0.004* (.0019)	-0.003* (.0016)	-0.004* (.0020)	-0.003* (.0016)	0.979* (.0086)
age ²	-0.000* (.0001)	-0.0004* (.0001)	-0.000* (.0001)	-0.000* (.0001)	0.997* (.0006)
married	-0.184* (.0486)	-0.156* (.0399)	-0.190* (.0502)	-0.156* (.0397)	0.437* (.0954)
years of schooling	0.016* (.0054)	0.013* (.0045)	0.016* (.0056)	0.013* (.0045)	1.073* (.0261)
children	-0.114* (.0557)	-0.096* (.0468)	-0.115* (.0579)	-0.095* (.0473)	0.604* (.1525)
working mother	-0.144 (.0929)	-0.122 (.0783)	-0.144 (.0963)	-0.119 (.0788)	0.533 (.2232)
attitudes	-0.152* (.0548)	-0.128* (.0456)	-0.155* (.0564)	-0.128* (.0452)	0.508* (.1243)

* $p < 0.05$

A.2.3. Cross-Country

OUTPUT 5: PROBIT AND LOGIT REGRESSION

	PROBIT			LOGIT		
	Coefficient	z	P> z	Coefficient	z	P> z
age	-0.021 (.0035)	-6.16	0.000	-0.036 (.0059)	-6.15	0.000
age ²	-0.001 (.0002)	-6.68	0.000	-0.002 (.0004)	-6.48	0.000
married	-0.494 (.1225)	-4.03	0.000	-0.848 (.2089)	-4.06	0.000
years of schooling	0.033 (.0140)	2.40	0.016	0.056 (.0238)	2.38	0.017
children	-0.233 (.1075)	-2.17	0.030	-0.387 (.1830)	-2.12	0.034
working mother	-0.377 (.2500)	-1.51	0.131	-0.623 (.4239)	-1.47	0.142
attitudes	-0.344 (.0916)	-3.76	0.000	-0.579 (.1527)	-3.79	0.000
country	-0.985 (.3713)	-2.65	0.008	-1.629 (.6286)	-2.59	0.010
country*education	0.028 (.0224)	1.25	0.210	0.045 (.0387)	1.17	0.242
country*working mother	0.584 (.2902)	2.01	0.044	0.971 (.4875)	1.99	0.046
country*married	0.478 (.1613)	2.97	0.003	0.808 (.2726)	2.97	0.003
constant	1.087 (.3076)	3.53	0.000	1.803 (.5233)	3.45	0.001
<i>pseudo r-squared</i>	0.146			0.146		
<i>correctly predicted</i>	71.65			71.73%		
<i>AIC</i>	1404.72			1404.13		

OUTPUT 6: MARGINAL EFFECTS AND ODDS-RATIOS

	PROBIT		LOGIT		Odds-ratios
	Marginal Effects		Marginal effects		
	<i>At the mean</i>	<i>On average</i>	<i>At the mean</i>	<i>On average</i>	
age	-0.008* (.0013)	-0.007* (.0010)	-0.008* (.0013)	-0.006* (.0010)	0.964* (.0057)
age ²	-0.0006* (.0001)	-0.0005* (.00008)	-0.0006* (.0001)	-0.0005* (.00008)	0.0004* (.0004)
married	-0.186* (.0462)	-0.159* (.0387)	-0.197* (.0484)	-0.162* (.0392)	0.428* (.0894)
years of schooling	0.012* (.0053)	0.010* (.0045)	0.013* (.0055)	0.010* (.0045)	1.058* (.0252)
children	-0.087* (.0405)	-0.075* (.0344)	-0.090* (.0424)	-0.074* (.0349)	0.678* (.1242)
working mother	-0.142 (.0942)	-0.121 (.0802)	-0.144 (.0984)	-0.119 (.0811)	0.536 (.2273)
attitudes	-0.129* (.0345)	-0.110* (.0290)	-0.134* (.0354)	-0.111* (.0286)	0.560* (.0855)
country	-0.371* (.1399)	-0.317* (.1185)	-0.378* (.1457)	-0.312* (.1195)	0.195* (.1232)
country*education	0.010 (.0084)	0.011 (.2835)	0.010 (.0090)	0.011 (.3486)	1.046 (.0405)
country*working mother	0.220* (.1094)	0.170* (3.33)	0.225* (.1131)	0.168* (3.707)	2.641* (1.287)
country*married	0.180* (.0608)	0.128* (3.20)	0.187* (.0632)	0.126* (3.749)	2.245* (.61226)

* $p < 0.05$

A.3. INTERACTION EFFECTS

FIGURE 1: PROBIT: COUNTRY \times EDUCATION

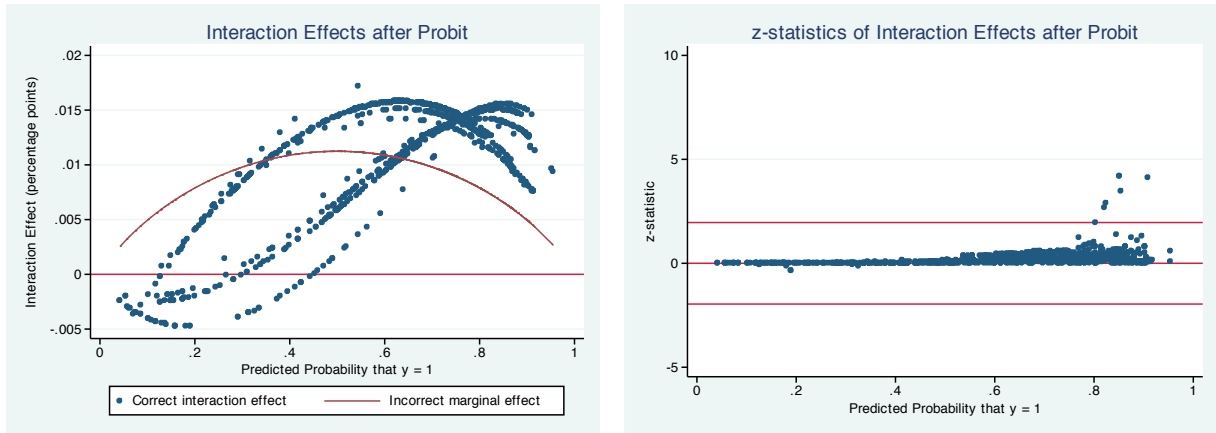


FIGURE 2: PROBIT: COUNTRY \times WORKING MOTHER

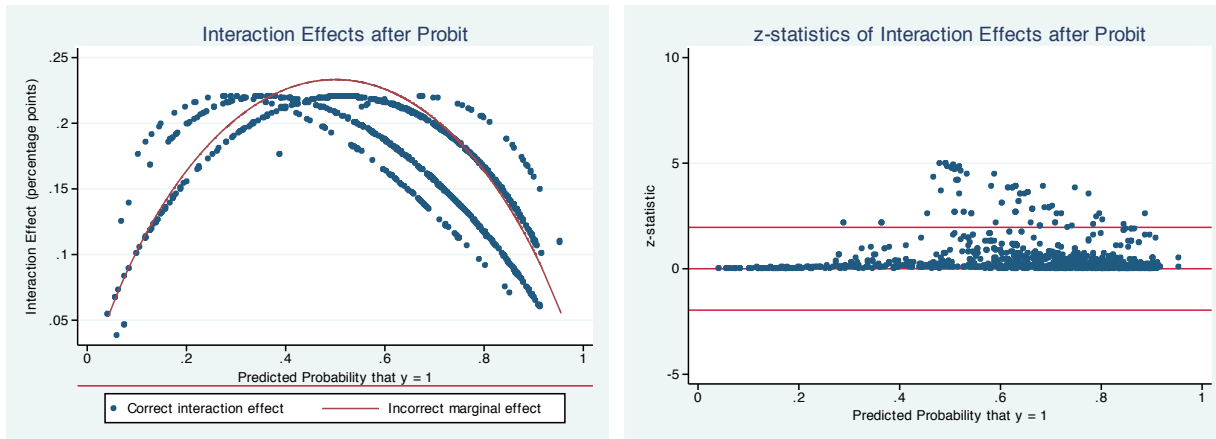


FIGURE 3: PROBIT: COUNTRY \times MARRIED

