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"Mental health effects of oral contraceptives access among European women"

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Contents

List of Figures

List of Tables

Introduction

When the contraceptive pill was first introduced in the US in the 1960s, it tremendously changed the way women made decisions with respect to childbearing, education, and labor market participation by offering more control over fertility.
While the birth control pill was a revolutionary breakthrough, it was not cheap and was rarely covered by insurance, meaning it was not available to all women who wished to use it.
The recent "power of the pill literature" that focuses on the relationship between oral contraception and health and economic outcomes is growing, liberalizing the effects of the pill for women, in the form of delaying childbearing, increasing labor market participation and/or raising investments in education.
Alongside these effects, the discovered link between hormonal contraception and mental health revealed some health side effects like depression, suicidal tendency, irritability that may increase vulnerability to subsequent episodes of major depression and other psychiatric disorders in older age (Skovlund et al., 2016).
The results from recent medical studies raise the concern that in addition to the liberalizing fertility control effect, the pill may also have a damaging effect on women due to its mental health effect.
The contribution offered by this study, after observing the years of introduction of the oral contraception among different European countries, at different ages, is that of re investigating the effect of the pill on labour market outcomes and education, in the light of the connection between the pill and women mental health.
The existence of a mental health cost related with the use can be expected to interact its positive effects on fertility control, resulting in a downward biased estimates of its impact on fertility.
We first examine whether access to the pill leads to worse mental health during life. For this we use data from SHARE (Survey of Health, Ageing and Retirement in Europe) for women aged 18 and 25 (from 1917 to 1983) which is a cohort that experienced differential access to the pill during the period of adolescence.
Differently from the majority of literature studying mental health effects of the pill and according with what we said previously, this research focuses mainly on the economic effects of the pill introduction.
Valder (2022) shows, after distinguishing between consent and legal access, that the consent access to the pill is associated with worse self-reported mental health. As opposite, in our investigation, regressions show that one additional year of treatment reduces eurod depressive symptoms by 0,85 given that the eurod scale ranges from 0 “not depressed” to 12 “very depressed”.

In a second step, we investigate the importance of this mental health cost for the liberalizing education and labor market outcomes established by the "power of the pill" literature.
Bailey et al. (2006) found that legal access to the pill before age 21 increased the number of women in the labor force, increased their total number of hours worked and decreased the likelihood of a birth before age 22, while Bailey et al. (2012) demonstrated that access to the pill at a younger age conferred an eight percent wage premium to young women and substantially reduced the gender wage gap in both the 1980s and 1990s.
For this reason, we estimate the effect of the pill on education and income and explicitly take the role of mental health into account.
A more recent evolution of this literature takes a more critical point of view toward the very large role of the contraceptive pill claimed by the studies above. Myers et al. (2017) addressed the relative importance of access to abortion versus access to the pill and argued that the effect of the pill was considerably smaller than the one of abortion, if existent at all.
For this reason, we decide to replicate the estimates for the access to oral contraception also for the access to abortion and, in order to make it comparable with the intensity of treatment that originates from the access to the pill, the structure of the analysis follows that of the previous one. It observes the fraction of years between 18 and 25 in which women are able to take benefit from abortion legalization.
From a policy perspective, this research addresses two important areas of public health: mental and reproductive health. Given the increasing prevalence of mental health problems, the fight against mental illness has become a priority on political agendas around the globe.
Recently, also reproductive health has received a lot of public attention, mostly related to abortion bans and funding cuts for abortion clinics in several US states.
In order to present our analysis, the work is structured as follows.
The first chapter evaluates the economic consequences and costs of having poor and rich mental health, by deepening the typical age of onset of mental disorders and the objective and subjective methods used to measure mental health and its impact on labour market outcomes of the individual and that of couples'.
Chapter 2 deals with the access to contraception, proposing an analysis of the US case with its empirical model. Later, we examine the attitudes of women toward contraception by interpreting the lack of access as an unmet need and we list some interventions (family planning programs) to eliminate this unmet need and to increase the demand for contraception.
Chapter 3 proposes an empirical analysis of the the impact that contraceptive policies in Europe have on mental health, by adding an overview of abortion policies. It ends with the investigation about the relationship between mental health, education, and labor market outcomes.

Chapter 1

Economic consequences of poor and rich mental health

1.1 Background

A lot of studies have been made in the literature to investigate on the relationship between health and socioeconomic status (SES), but there is still a great deal to be learned about how the two are linked.
A huge amount of research has been centered on analyzing the health-wealth gradient.
World-wide, mental illness is among the most prevalent and disabling illnesses. The most severe mental disorders, schizophrenia, manic depression, and some forms of major depression affect about 4% of the population each year and are very disabling (McGuire et al., 2000).
Although mental illness continues to be one of the leading contributors to the burden of disease, there is limited information on the economic impact that mental illness causes on individuals, families, workplaces and the wider economy.
The term mental illness describes different behavioural conditions, including severe personality and depression disturbs. People with severe mental disorders represent a vulnerable and socially excluded population and are more likely to be affected by lower educational and social opportunities, social alienation, and increased morbidity and mortality rates.
Mental and addictive disorders are costly to society both in terms of direct spending on treatment as well as in terms of the losses sustained as a consequence of the disorders.
Besides causing suffering, poor health can affect individual and social welfare by reducing productivity and earnings capacity. Previous literature affirmed that indirect cost of mental illness has also been studied in terms of employment and earnings.
A common finding by Bruce, Takeuchi and Leaf (1991) in psychiatric epidemiology is an inverse correlation between income and rates of illness in a population.
Three other recent studies – two in the USA, one in the UK – provided further intelligence on the links between depression and employment. Almond and Healey (2003) shown that (self-reported) depression/anxiety is the single most important cause of workplace absenteeism in the UK. Kessler et al. (2001) described the hidden impact of depression on reduced productivity at work. Moreover, there is evidence that remission of depressive symptoms more rapidly affects employment status than health service utilisation (Simon et al., 2000).

Ettner et al. (1997) used cross sectional data from a national epidemiological survey of the US population to examine the effect of mental and addictive illnesses on employment and earnings. Information on the family history of mental illness and the timing of the onset of symptoms of mental illness enabled the authors to use instrumental variable techniques to estimate the impact of mental illness on income taking account of possible endogeneity of mental illness. They found that the presence of a mental illness reduced employment by about 11% for both males and females and for those who worked, the estimated loss of income attributable to mental illnesses was about 20% for women and 10% for men.

McCrone et al. (2008) estimated the cost of mental health expenditure in England for the next 20 years to 2026.

The elements used to estimate total costs for depression were: prescribed drugs, inpatient care, other NHS (Nation Health Services), supported accommodation, social services and lost employment.

The purpose of the study was to derive 'typical' annual service packages for each mental disorder and, where possible, to produce these for males and females and each age group separately. In attaching monetary values to service packages it is important that they reflect the true economic costs of services.

McClellan (1998) used negative health shocks that occur between waves 1 and 2 of the Health and Retirement Study, such as a heart attack or new cancer diagnosis, to estimate the effect of health on own labor supply, while Smith (2003) looked at the effect of health shocks on labor supply, medical expenditures, family income and wealth.

The authors derived estimates for depression, anxiety disorders, schizophrenia, bipolar disorder and related conditions, eating disorders, personality disorder, child and adolescent disorder. Results shown the number of people in England who experienced a mental health problem will increase by 14.2%, with health service costs estimated to increase.

However, the treatment of mental illnesses has changed dramatically over the past 40 years, in part due to scientific changes in treatment technology such as pharmaceutical innovation (Berndt et al., 1997; Grob, 1991) and improved approaches to brief psychotherapy.

Economic analyses of the cost of illness and other assessments of the global burden of disease underline the disabling effect of mental disorders.

Three studies examined the impact of poor mental health on school completion.

Leach et al. (2012) founded that age of onset of mental disorders is an important factor in predicting the course of illness and psycho-social factors such as educational attainment.

Early onset mental disorders may lead to the early termination of education and thereby have long term adverse social and economic consequences on outcomes such as employment and financial security.

Two Australian studies, Paradise and Schofield (2011, 2012) examined the association and the impact of mental disorders on earlier and ill retirement.

In New Zealand, Gibb et al. (2010) used longitudinal data to examine whether common psychiatric disorder between ages 18 and 25 was associated with negative economic and educational

outcomes at age 30.
Doran (2017) published a rapid review of the literature from Australia, New Zealand, UK and Canada pertaining the cost of illness and the impact of mental illness on individuals, families, workplaces and the wider economy.
In his study, he evaluated most of the COI (cost-of-illness) literature defining costs as direct and indirect (or productivity). The measurement of direct costs was standard in all studies.
Among those studies that valued indirect costs, the majority followed the human capital approach that measures lost productivity as discounted earnings. Health can be a major determinant of productivity because an individual's capacity to fulfill his job requirements is closely related to their health.
Findings suggest that people with mental illnesses have substantially poorer physical health than the general population and remain at considerably greater risk of having rebounds on the everyday life.
Realizing that mental and physical disorders have several economic, health and social consequences on people's lives, the analysis takes into account the possibility that health problems may appear during lifetime of individuals such as shocks. These unexpected health shocks are very common for workers during their 50s and 60s and can result in significant losses that destabilize their daily lives.
This review provides a summary of the economic impact and cost of mental illnesses. But an unanswered question arises from this analysis. In spite of the high prevalence in societies of mental and physical disturbs, why we found scarce research relating to the costs and impact of mental illness?
Specifically, more research is required in order to better understand the impact on the economic framework of disorders like anxiety, depression, cognitive functions.

1.2 The economic costs of poor health

People tend to underestimate the costs and the implication of mental problems for many reasons. First of all, the majority of policymakers tend to consider mental illnesses as disorders that differ from the other medical problems.
Surviving a severe and acute illness can disrupt peoples' lives and have various long-term consequences. Labor market outcomes, productivity at work, and preferences regarding work and leisure are likely to be affected during illness, treatment, and convalescence.
Moreover, the longitudinal effects are not limited to individuals who suffer, but also to the others living in the household. Poor mental health not only creates a risk of not being employed, but unemployment or poverty can also lead to deterioration in physical health.
Often people do not take into account how common mental health disorders are, maybe because are still stigmatized.
Mental diseases are more disabling than most people realize, often preventing those afflicted from working, studying and also caring for others.

We select data from the Survey of Health Ageing and Retirement in Europe (SHARE) which contains longitudinal measures of health of individuals aged 50+ in 17 different countries in order to observe the impact that a sudden health shock may have on households' net income, organized for age group. SHARE also contains detailed measurements of other aspects of the respondents' life-course trajectories such as family circumstances, employment and pension arrangements, cognitive function and a large amount of questions on health and health events.
We take advantage of the rich set of information available in the SHARE dataset, more precisely, easySHARE. EasySHARE includes the same number of observations as the main release of SHARE but is restricted to a subset of variables. For this type of investigation, we use all available waves, with the only exception of the easySHARE wave 3, as that collected only life history information.
Permanent health shocks may influence labour market decisions (e.g. early retirement, reduction in hours worked, etc), affect savings, investments and more general budgetary planning. We are focusing on respondents aged 50+ who are relatively more vulnerable to long-lasting traumas and to the onset of chronic conditions.
Firstly we organized people in the sample by grouping them by age. We create 6 groups that range from 55 to 80+ years old in order to obtain a final sample of around 250,000 people.
In the next step, we create the variable *chronic_disease* that is the simple set of illnesses the patient has received a diagnosis of, from the following list: hypertension, heart disease, stroke, diabetes and chronic lung disease.

Figure 1.1 relates how the household net income changes after an health shock diagnosis. The level of net income varies across age groups and it is notable that heart attacks and hypertension are more frequent among the other disturbs.
Moreover, for comparison, we decide to observe the households net income also according to other three specifications: men-women (Figure 1.2), living with a partner or not (Figure 1.3) and educational level (Figure 1.4).

Thomas et al.(2003) described some of the indirect costs, estimating that the effect of mental/physical health on employment (and hence on national productivity) in cost terms is 23 times larger than the costs falling to the health service. Productivity losses for the economy are worrying, but the associated earnings loss for people with physical and mental disturbs could be devastating.
Moreover, some studies observed that there is a significant effect of health on the employment outcomes: individuals who incur a health shock are significantly more likely to leave employment than those who do not.

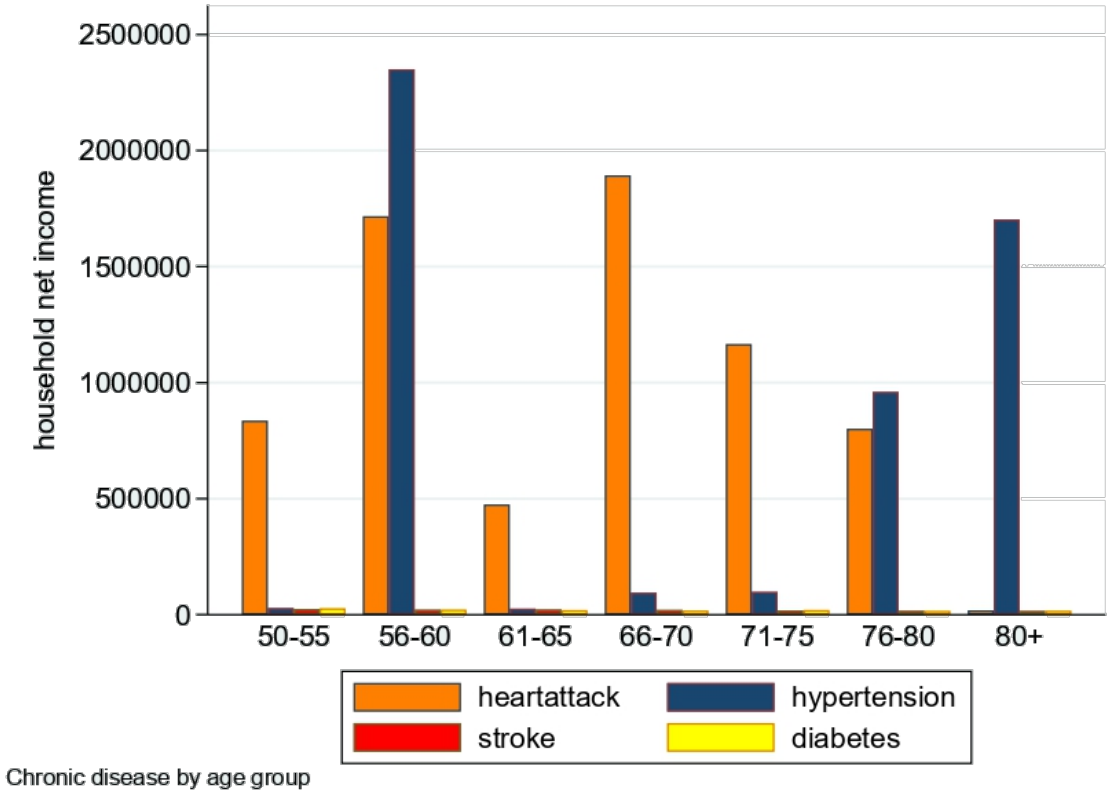

FIGURE 1.1: Levels of net income in the households in presence of a chronic disease
Source: author's own elaboration

1.2.1 The age of onset of mental disorders

The age of onset of mental disorders has been shown to be an important factor in predicting the course of illness and psycho-social factors such as educational attainment (Zisook, 2004; Levine and Rabinowitz, 2009).

An observation of the age of onset of mental disturbs is relevant to distinguish between the proportion of the population that has a disorder at some time in life up to the age of interview (lifetime prevalence) and the proportion of the population that will have a disorder by the end of life (projected lifetime risk).

Moreover, understanding the age of onset is important for developing prevention against mental disorders. In the absence of AOO (age of onset) information, we would have no way to know the appropriate age range to target preventive interventions.

Mood and anxiety disorders have an earlier age of onset than most other medical conditions. They often emerge during critical windows for psychological and social development and can interfere with completion of education, initiation of careers, and establishment of relationships. The average age of first onset of major depressive disorder (MDD) is in the mid-20s, although first onset can occur from childhood through old age.

An early age of onset has been associated with increased familiar loading for depression (Weissman, 1988; Klein, 2001; Neuman 1997), particularly when the affected parent has had an early age of onset.

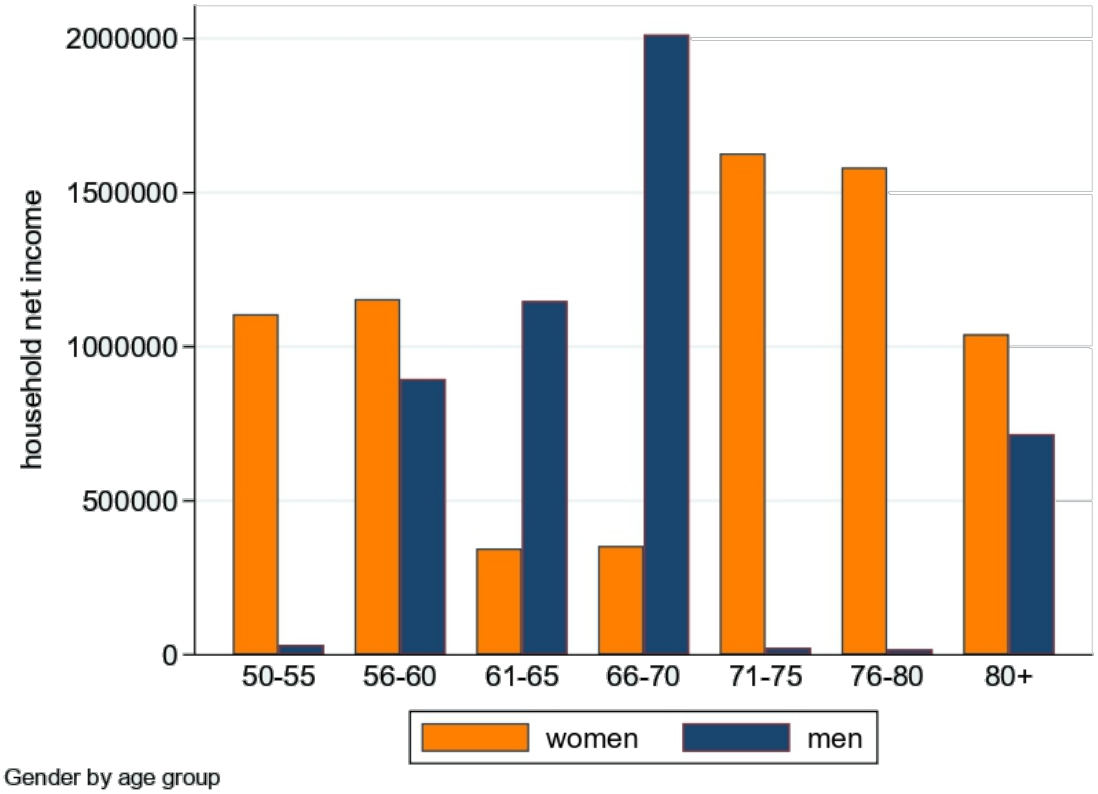

FIGURE 1.2: Levels of net income men-women
Source:author's own elaboration

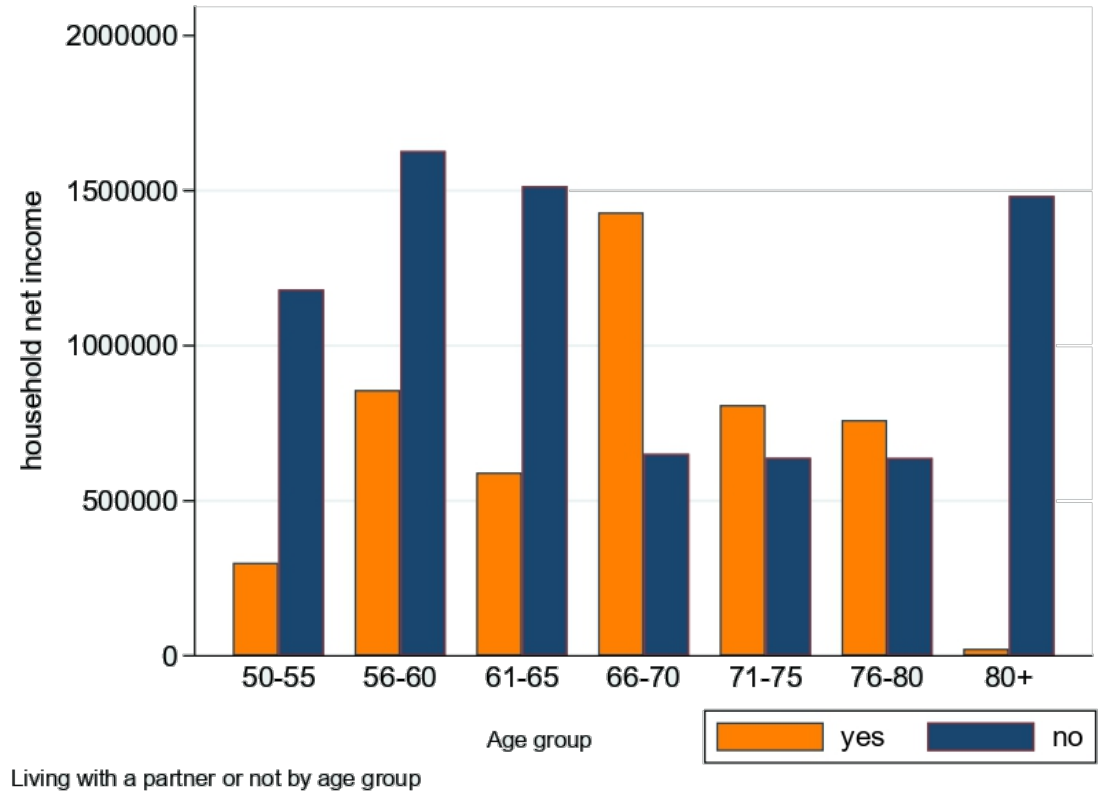

FIGURE 1.3: Levels of net income being in couple or not
Source:author's own elaboration

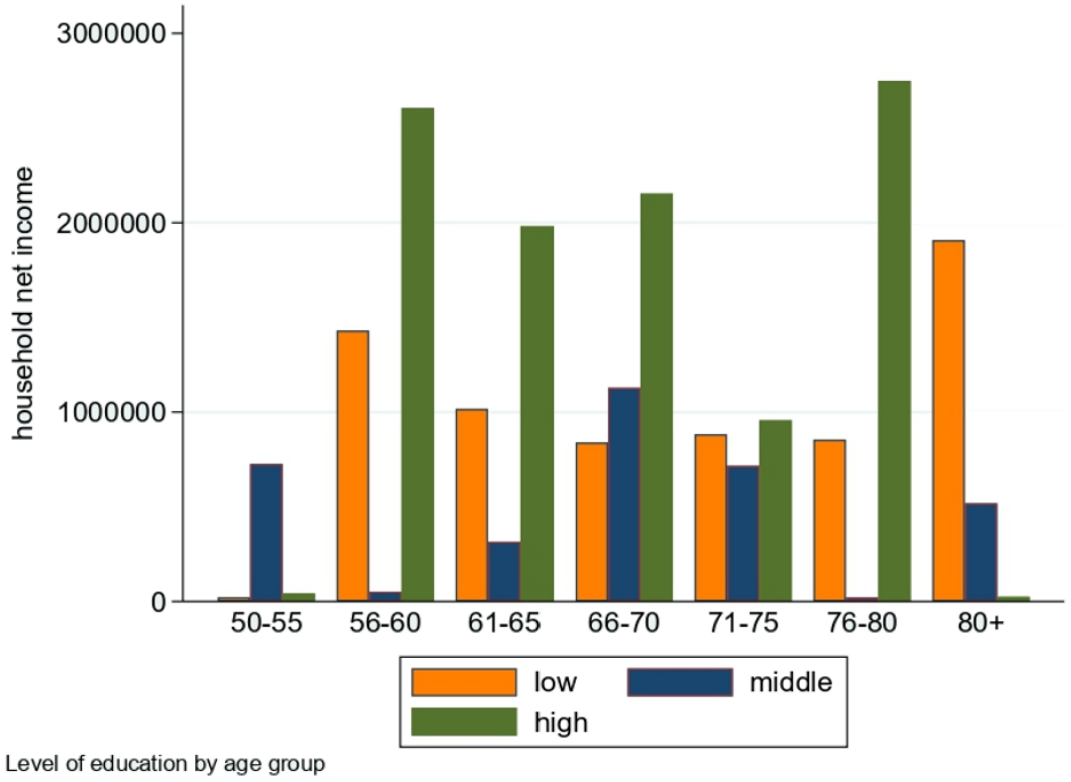

FIGURE 1.4: Levels of net income for educational level
Source:author's own elaboration

Some studies have reported that females have an earlier age of onset of MDD than males (Kornstein, 2000).

WHO World Mental Health (WMH) surveys (a collaborative project by World Health Organization, Harvard University, University of Michigan, and country-based researchers worldwide to coordinate the analysis and implementation of epidemiological surveys of mental and behavioral disorders and substance abuse in all WHO Regions) initiative consists of coordinated population surveys in 28 countries. The main aim is to provide estimate of the prevalence, distribution, societal burden, and patterns of treatment of mental disorders to health policy makers for planning purposes.

The WHO regions and 16 countries that have completed and published WMH results up to now are Africa (Nigeria; South Africa), the Americas (Colombia; Mexico; United States), Asia and the Pacific (Japan; New Zealand; Beijing and Shanghai in the People's Republic of China), Europe (Belgium; France; Germany; Italy; the Netherlands; Spain; Ukraine); and the Middle East (Israel; Lebanon).

The mood disorder AOO distributions in the WMH surveys are quite similar to those for the later-onset anxiety disorders. Mood disorder AOO curves show consistently low prevalence until the early teens followed by a linear increase through late middle age and a declining increase thereafter. The median AOO of mood disorders has a very wide range across countries (25–45). Zisook et al. (2004) conducted a study that explores the relationship between age of first onset

of major depression and other demographic and clinical features in the first 1500 patients entering the Sequenced Treatment Alternative to Relieving Depression (STAR*D) study.
Table 1.5 summarizes the sociodemographic and key clinical characteristics of the sample. The total *N* is less than 1500 because 18 participants had missing data for age of onset of first depression.
The mean age of onset of MDD was 25 years (range: 2–73 years). About 36% of patients had an onset of mental disorders before 18 years old. The mean age of onset in the early-onset group was 12.4 years, while it was 32.4 years in the later age of onset group.
Figure 1.6 shows the frequency of age of onset of MDD (Major Depressive Disorders) in three year increments. Early-onset patients were younger than late-onset patients (mean age 35.7 years, vs. 43.3 years). In addition, women were more likely than men to have an early onset of MDD (40% of women vs. 30% of men).

1.3 Objective and subjective measures of health

Estimations of the casual effect of ill-health on labour outcomes is affected by potential biases, Garcìa-Gomez et al.(2011). Literature studying this type of link exploits different measures of health.
The large existing literature on health and retirement is also relevant for this analysis. One method used in literature is to include self-reported health status or work limitations in the retirement model (Diamond and Hausman, 1984 or Hanoch and Honig, 1983). Studies using this method have found large effects of health on retirement.
However, that type of methods are subject to measurement error, as individuals' subjective judgements of what constitutes poor health may vary substantially, and to endogeneity concerns, as self reported measures may not be independent of labor force outcomes if people rationalize their retirement by claiming an health problem.
Indeed, two main problems arise in measuring the effect of health problems on labour outcomes in a subjective manner.
Firstly, in a single-equation estimation, the health effect may be biased because the state of health itself in part represents a choice.
Secondly, problem is that studies which rely on subjective assessments of health are likely to be biased in the direction of poor health among the retired.
Another strand of literature uses objective measures of health such as information on medical

Characteristics	*n*	%
Setting		
Primary care	533	35.5
Specialty care	967	64.5
Race		
White	1112	74.1
Black or African-American	268	17.9
Other	120	8.0
Ethnicity-Hispanic	138	9.2
Sex-female	936	62.7
Marital status		
Never married	428	28.6
Married	628	41.90
Divorced	400	26.70
Widowed	41	2.70
Family history of depression	828	55.5
Employment status		
Employed	882	59.0
Unemployed	519	34.7
Retired	95	6.3
	Mean (S.D.)	Median (observed range)
Age (in years)	40.6 (13.23)	40 (18–75)
Education (in years)	13.5 (3.21)	13 (0–27)
Income (in dollars)	2432 (2972)	1600 (0–30,000)
Age of onset of first MDE	25 (13.90)	21 (2–73)
Number of MDEs	6 (9.3)	3 (0–98)
Length of current MDE (in months)	21 (51.88)	7 (0–716)
Length of illness (in years)	15.4 (13.23)	12 (0–64)
HRSD-17 (ROA)	20.4 (6.61)	20 (0–40)
IDS-C30 (ROA)	35.8 (11.62)	36 (0–74)
QIDS-SR16	15.4 (4.20)	15 (2–27)
SF-12 (IVR)		
Physical	49.5 (11.71)	51.9 (16.2–67.5)
Mental	26.4 (8.41)	25.6 (7.4–62.2)

FIGURE 1.5: Baseline characteristics
Source:S. Zisook et al. / Psychiatry Research 129 (2004) 127–140

conditions or subsequent mortality[1]. They choose mortality because it has been used as a measure of health, because it is measured for all respondents, and because it is independent of the

[1] See, for example, Anderson and Burkhauser (1985), Bazzoli (1985), and Chirikos (1984).

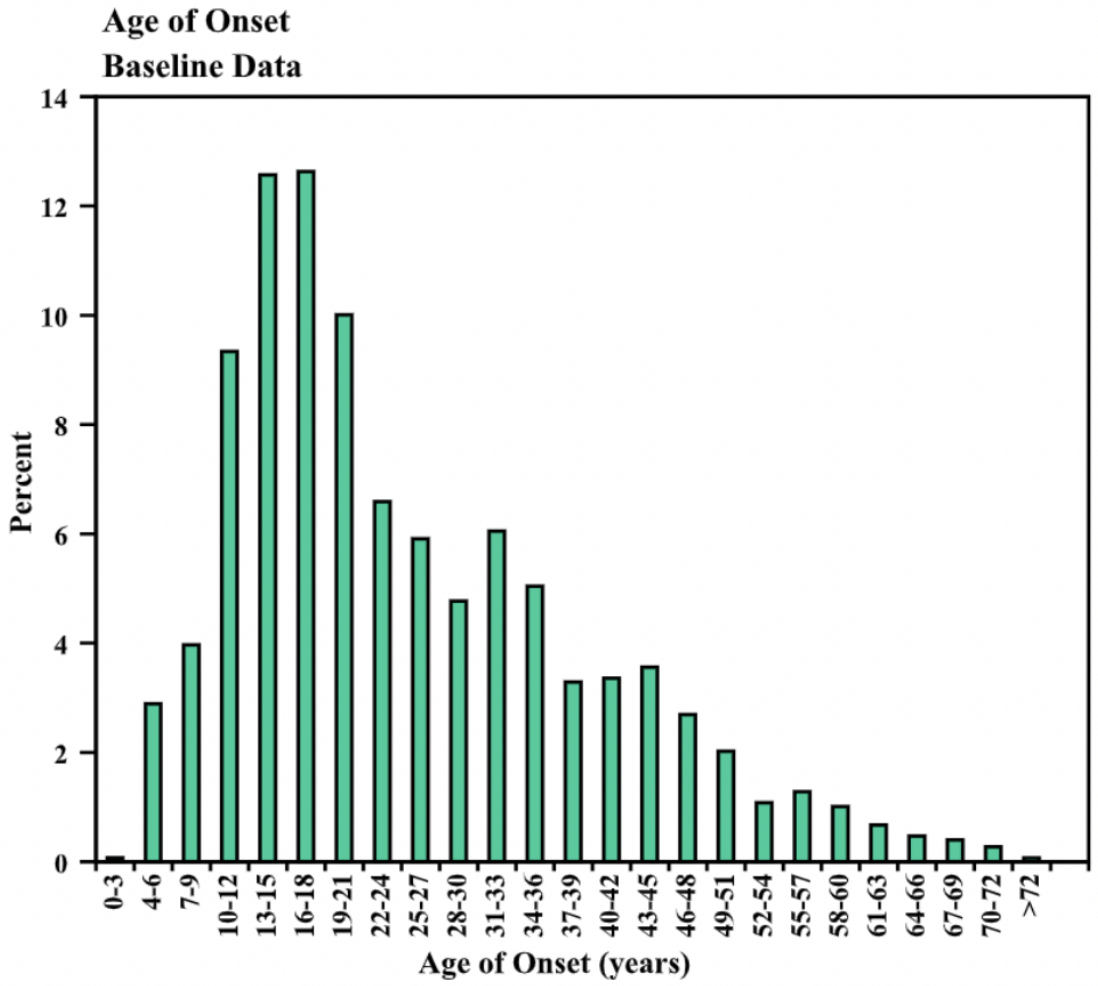

FIGURE 1.6: Frequency of Age of Onset in 3-Year Increments
Source:S. Zisook et al. / Psychiatry Research 129 (2004) 127–140

respondent's reporting bias.

Previous works have adopted a variety of approaches, including satisfaction with health (Riphahn, 1999), latent variables indicators (García-Gómez, 2010), road injuries or commuting accidents (Dano, 2005; Halla and Zweimüller, 2013), or acute hospital admissions.

For example, Garcìa-Gòmez in her study used two measures of health shocks. The first is based on the responses to the question on self-assessed health in the ECHP (European Comunity Household Panel) "How good is your health in general?".

From the five possible responses (very good, good, fair, bad and very bad), she considers that the respondent has undergone an adverse health shock if he or she reports "fair", "bad" or "very bad" in any given period, with the timing of the shock occurring sometime between the last period when he or she recorded any of the other two alternatives.

The second health measure used is based on responses to the question on chronic illnesses "Do you have any chronic physical or mental health problem, illness or disability?".

Trevisan et al. (2016), to overcome the endogeneity of health with respect to labour market behaviour (Haan and Myck, 2009), used an identification strategy that exploits innovations in

health induced by the first onset of an acute health shock, namely the first onset of cancer, myocardial infarction or stroke.
Lixin et al. (2013), used data that reports separate measures of health status and health shocks: the Household Income and Labour Dynamics in Australia (HILDA) Survey.
Using distinct measures of health status and shocks reduces the probability that measurement error in the health status variable may contaminate the health shock variable, as the measure of the latter is derived from specifically designed questions that are independent of the health status questions.
Indeed, it is important, for understanding the effects, to distinguish the long-run nature of reported health status and the short-run nature of reported health shocks.
An health shock is defined as a change that happened in the last 12 months, is less likely to have had enough time for all possible compensatory behaviours to have taken place because of the surprise element and the lack of adjustment time often associated with unexpected shocks.
Health status otherwise, can be viewed as a measure of permanent health, and as such, it cannot be expected to influence hours worked and participation in the same way as the potentially transitory health shocks would.
Clearly, we cannot consider the two measures of health shock and health status independent of each other but we can expect that they lead to different labour market outcomes.
There is no consensus about the preferred method in measuring mental health. Although Dwyer and Mitchell (1999) reported little evidence of the justification hypothesis or of measurement error in objective health measures, Bound (1991) found evidence of both and shows that instrumenting for self-reported measures with objective measures may lead to bias in estimating the effect of other explanatory variables.
Baker et. al. (2004) compared self-reports of objective measures of health such as cancer status with data from health records and found that there is considerable error in the self-reports and that the error is correlated with labor force status, providing a further rationale against using objective measures .
In this research, health' measures are mainly structured on subjective measures based on the answers to the questionnaires of the interviewees to specific questions about their well-being across waves.
An important assumption underlying main studies is that health shocks are, in fact, unexpected. Smith (2003) found that gender, race, education, health status, body-mass index, and behaviors like drinking, smoking, and exercise are all significant predictors of future major health events. Despite that, there will be a good deal of uncertainty regarding whether any individual will have a health event conditional on his risk factors and even more uncertainty regarding the timing of the health event, assuming that individuals are even aware of the link between the risk factors and health events.

1.4 The impact of health shocks on labour market outcomes

Economists began to study the relationship between health and earnings/labour outcomes by adding an explanatory health status variable to the estimated earnings equation. As Bartel and Taubman (1979) argued, health problems are likely to influence the accumulated amount, costs, and returns to human capital or skills acquired. Previous research has shown that health has a substantial effect on a variety of labor market decisions and outcomes including wages received and hours worked by individuals.

More recently, studies have begun to consider the longitudinal effects of health on earnings (Chirikos and Nestel, 1985).

They found that health problems incurred within the 10-year period had negative impact on the current labor market outcomes. Those continuously in poor health had significantly lower wages and worked fewer hours than continuously healthy individuals.

Health is likely to have different impacts on individuals in the labor market depending on the age of the individual at the onset of illness. Individuals who are in the early stages of their work life may make very different adjustments to random health shocks than individuals approaching retirement age.

Pelkowski and Berger (2004) used the American Health and Retirement Survey (HRS) and found that permanent adverse health conditions reduce both wages (8.4% for males and 4.2% for females) and hours worked (6.3% for males and 3.9% for females). Moreover, they found that the decrease in employment and wages is larger for prime-age individuals, as the peak of loss of wages after the onset of a permanent illness occurs at ages 40–49 for males (wages are 12.1% lower) and 30–39 for females (wages are 9.2% lower).

After the onset of a mental health disturb, an individual can follow several paths (Aarts et al., 1996):

1. Work
2. Early retirement (only for older workers)
3. Traditional disability insurance schemes (sickness, general disability and work injury)
4. Unemployment
5. Other schemes for those not eligible for any other option

Figures 1.7 and 1.8 summarize the main differences between countries in terms of social security systems in the spheres of disability, unemployment and retirement.
Some countries define disability in terms of a reduction in the individual's work capacity (Denmark, Ireland, Italy and Spain).
Others do so in terms of a reduction in earnings capacity (Belgium, France, Greece, The Netherlands and Portugal).
The figure also shows that some countries apply mandatory quotas obliging employers to have a certain proportion of disabled workers among their employees (7% Italy, 6% France, 2% Spain), or some sectors (3% in the public sector in Ireland and 5% for new recruitment in the public sector in Portugal). These quotas are absent in Denmark, Netherlands and Belgium. The only exception is Ireland, where the invalidity pension requires permanent full incapacity (European Commission, 2004).
In her empirical strategy (Garcìa-Gòmez, 2010) estimated the Average Treatment Effect on the Treated (ATET), which measures how much the outcome of interest changes on average for those individuals who undergo the treatment (who suffer the health shock). She discovered that the occurrence of a health shock has a causal effect on the probability of being in employment. The magnitude of the effect differs across countries. There are two countries (France and Italy) where the point estimate for this effect is not statistically significant. Otherwise, the largest effects exceed 6% in Denmark, The Netherlands, Spain and Ireland.
Results shown also that the chances of an individual staying in employment after a health shock are affected by the disability policies in his country. She observed that health shock tends to reduce activity more in countries where the integration dimension of disability policies is lower (Ireland) than in countries that score high on this dimension (Denmark and The Netherlands).
The estimates shown that more inspiration is needed in order to avoid the adverse employment effects detected in some European countries. The good news is that there seems to be scope for learning from the experience in neighbouring countries.

1.5 Health shocks and couples' labour market participation

Experiencing an illness can influence peoples' lives and have several short and long term consequences. However, effects are not limited to the individuals who suffer the physical or mental disturb, but also can be extended to the other households' members.
Within couples, spillover effects concern especially labor supply decisions of the spouse. Spouse's reaction, indeed, may smoothen or reinforce the earning loss of the individual.
The existing literature shown conflicting results regarding the labor supply of spouses following a health shock. This could be due to the lack of investigation into differences in characteristics of spouses in relation to each other.
Findings on the impact of a health shock on spouses' employment and earnings are often conflicting. In some cases, an added-worker effect is identified: the spouse increases his/her labor

supply in order to compensate for the loss of income due to the sick spouse's reduced work effort.

Gruber and Cullen (2000) looked for an "added worker effect" (AWE) of wives' increasing their labor supply when husbands become unemployed.

In a simple model, the negative shock results in a loss of lifetime income, which will cause the spouse to increase his labor supply, assuming that leisure is a normal good, this is known as the Added Worker Effect (AWE).

Moreover, the household's costs of living might increase due to medical expenses and the need to buy additional services. As opposite, the spouse may decide to reduce labour supply due to the need to provide care for the ill spouse (*caregiver effect*) or due to the preference to spend more time with the ill partner (*joint leisure effect*).

Acuna et al. (2019) found the added-worker effect only for younger age groups. Coile (2004) concluded that particularly among older couples, the added-worker effect was small.

However, medical studies tend to overlook that the couples' lives are linked (Elder at al, 2007; Settersten, 2015). Indeed, within a couple, the decision about work can be interpreted as a turning point such as marriage, divorce, childbirth. It is a turning point since it requires the reassessment of the labour within the household (DiPrete and McManus, 2000).

A couple's reaction to a health shock is likely to depend on the combined employment of both spouses. Theories of specialization predict that couples decide that one spouse, usually the one with higher earnings and usually the man continues to work, whereas the other takes care of the household (Becker, 1985; Juhn and McCue, 2017; Killewald and Gough, 2013).

In couples where the man is higher educated than the spouse (hypogamy), there is a greater pressure on the ill to continue to work. In this situation, if medical conditions prevent him to continue to work, it is unlikely that the female spouse will increase the labour supply.

Riekhoff and Vaalavuo (2021), provided some hypothesis about couples' reaction to health shocks, accounting for different educational levels between male and female spouses.

In couples where the man is higher educated than the spouse (hypogamy) there is greater pressure on the sick one to continue working, given that he probably has higher earnings. However, if the consequences of the health shock prevent him from continuing to work, the female spouse is unlikely to increase labor supply. If previously employed, she might consider retirement or reducing work hours due to the low marginal gains from work

Hypothesis 1: In educationally hypogamous couples, the man is less likely to reduce his work effort, while the female spouse is less likely to maintain or increase levels of work effort following a health shock.

Hypothesis 2: In educationally hypergamous couples (the woman's education is higher than her sick spouse's), the man is more likely to reduce his work effort, while the female spouse is more likely to maintain her work effort or increase it following a health shock.

In couples characterized by educational homogamy, the couples reassess the opportunities and need for adjusting the labor supply of both spouses.

Hypothesis 3a: Men with health shocks in lower-educated homogamous couples are more likely

to reduce their work effort than those in higher-educated homogamous couples, while women in lower-educated homogamous couples are more likely to maintain or increase their work effort.
Hypothesis 3b. Men with health shocks in higher-educated homogamous couples are more likely to reduce their work effort than those in lower-educated homogamous couples, while women in higher educated homogamous couples are more likely to maintain or increase their work effort.
The study makes use of the Survey on Ageing, Health and Retirement in Europe (SHARE), in particular, the retrospective life course data (SHARELIFE) collected in waves 3 and 7.
The results indicate that the health shock is predominantly associated with the changes in male spouse's employment and not so much with that of the female spouse.
The findings for educationally hypogamous and hypergamous couples are in line with expectations that the relative earnings of both spouses co-determine the division of work within the household when a health shock occurs. When the man is higher educated than the woman, the couple is less likely to follow a trajectory of two full-time earners. In contrast to Hypothesis 1, they did not find that men in hypogamous couples were less likely to reduce their effort following a health shock.
On the other hand, when the woman is higher educated than the counterpart (i.e. hypergamy), she is more likely to continue working while her spouse retires. This is in support of Hypothesis 2. Higher-educated women are likely to be more attached to the labor market.
In line with Hypothesis H3a, they find that among couples where both spouses have lower or mid-level education, but not among homogamous higher-educated couples, the health shock is negatively related to the trajectory where both spouses continue to work full-time and positively related to the trajectory where the male spouse retires while the woman remains in full-time work.
Thay did not find support for Hypothesis 3b that proposed that in higher-educated homogamous couples men are more likely to reduce and women more likely to maintain work effort.
Riekhoff and Vaalavuo (2021) study illustrated how opportunities and restrictions for labor market participation within couples are interdependent and subject to the household's combined economic resources.
Studies in this field found that health shocks represent real financial losses for the family, as any labor supply increase by the spouse is swamped by the labor supply decrease by the sick individual.
Future researches may contribute to explain why men's and women's responses to health shocks are not always symmetric.

	Denmark	Netherlands	Belgium	France	Ireland	Italy	Greece	Portugal	Spain
Disability benefits:									
Expenditure disability/expenditure unemployment (2000)	1.13	2.29	0.79	0.81	0.55	3.55	0.78	3.42	0.66
Expenditure disability/expenditure old-age benefits (2000)	0.31	0.32	0.28	0.15	0.27	0.11	0.10	0.34	0.18
Disability is work or earn related	Work	Earn	Earn	Earn	Work	Earn	Earn	Earn	Work
Minimum level of incapacity for work to be entitled to disability benefits	50%	15%	66.6%	66.6%	Permanently incapable of work	66%	50%	Earnings capacity no more than 1/3 of normal occupation	33%
Disability benefits depend on previous earnings	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

FIGURE 1.7: Institutional features of the group of countries included
Source:P. García-Gómez / Journal of Health Economics 30 (2011) 200–213

Disability benefits can be accumulated with earnings from work	Accumulation possible, but with benefit reduction.	Accumulation is possible, but the rate of benefit may be revised.	A professional activity during the period of disability may be authorised by the mutual insurance company's medical advisor. The amount of the daily benefit thus allocated may not exceed the daily amount that would be allocated if there were no accumulation.	Suspension of the pension if the pension and the salary received during two consecutive quarters are greater than the average quarterly salary for the last calendar year before stopping work prior to invalidity.	Accumulation with earnings not possible. Invalidity requires permanent full incapacity.	No accumulation possible for incapacity pension; partial accumulation for partial pension.	Accumulation with earnings from a professional activity is possible, but the payment of the invalidity pension is interrupted when the earnings from the activity exceeds the earnings that a healthy worker can attain.	Accumulation possible up to the limit of the reference earnings.	Permanent incapacity pensions are compatible with earnings, provided the activity is consistent with the pensioner's physical condition and does not imply a change in his/her capacity to work.
Preferential employment for handicapped persons	Public authorities have to give preference to handicapped persons who cannot get employment in private enterprises, but who are considered capable of working. The municipality provides subsidies to employers offering a job to the disabled.	No regulations.	No regulations.	Preferential employment of handicapped persons on staff up to 6% of total in firms with 20 or more employees.	Public authorities reserve up to 3% of suitable positions for disabled persons.	Persons disabled by industrial injuries are placed and employed in enterprises with a staff of 50 or over (one such person for each 50 workers).	For certain categories (e.g., the blind).	Firms employing a staff of at least 10 are obliged to employ handicapped persons incapacitated as a result of an accident occurring in the workplace.	Quotas may be established for the employment of handicapped workers (employers with a permanent workforce of over 50 to set aside 2% for handicapped workers). Also social security contributions relief.

FIGURE 1.8: Institutional features of the group of countries included
Source:P. García-Gómez / Journal of Health Economics 30 (2011) 200–213

Chapter 2

Access to contraception

2.1 About birth controls

The introduction of the birth control pill across world in the years between 1960 and 1980s marked the end of a relatively short period of time to intentionally produce an oral contraceptive and the beginning of a relatively long period of debating surrounding the use the pill.
The availability of the pill had an impact on various aspects of social and economic life, including women's health, fertility trends, education, occupation, interpersonal relationships and family roles, gender relations, as well as sexual practices among both adults and adolescents.
The pill proved to be highly effective from the outset. Although safety problems developed with the earlier formulations, continued evolution of pill hormones and doses has resulted in a greatly improved and safe oral contraceptive. An huge set of non-contraceptive health benefits also is associated with the pill. These health effects are significant, as they include protection against potentially fatal diseases.
The popularity of the pill has remained high in the years after its introduction almost everywhere as documented by the literature concerning 'the power of the pill". About 40 years after its introduction, the pill's contraceptive efficacy is proven, its improved safety has been established, and the focus has shifted from supposed health risks to documented and real health benefits.
However, trust and positive considerations about the pill have not always been such. Even if its effectiveness has been proved from the outset, the debate about its side effects has been substantial from the beginning.
The U.S. Food and Drug Administration approved oral hormonal contraception, the "pill," in 1960; this marked the initiation of the era of truly modern contraception.
One reason for distinguishing between modern and traditional contraception is the difference in their effectiveness in preventing conception. Modern methods are very effective when properly administered, whereas traditional methods tend to have high failure rates.
In the second half of the 20th century, several European countries had legal restrictions on the use of contraceptive methods, reflecting the influence of religious institutions, notably Christian churches. In Netherlands, for example, "it was forbidden to sell or advertise contraceptives" in the 1960s, but few years later, Netherlands government removed the prohibition. In principle, none of these restrictions are any longer in force early in the 21st century.

Abortion regulation can be divided into 5 categories (Frejka T., 2008):

- strict prohibition, or abortion only allowed to protect the woman's life
- abortion also permitted to protect a woman's physical health
- abortion permitted to protect a woman's physical and mental health
- abortion permitted on socioeconomic grounds
- abortion permitted on demand during a prescribed period of the pregnancy

After 1950, abortion laws were liberalized in almost all European countries, although few countries have some legal constraints, and there are two significant exceptions.
The most restrictive laws are still in force in Ireland. In Poland, abortion was permitted on socioeconomic grounds in 1956, but the law was revised in 1993 to permit abortion only when a pregnancy threatens the woman's life or health.
Typically, only the means to prevent conception and births (contraception and induced abortion) have been included under the concept of birth regulation.
Many early concerns about the pill came from the lack of long-term experience with its use. Although the pill has been tested before it entered the market, it has not been used for many years.
Thus, many concerns abounded. Because pill use consisted of daily administration of hormones, both users and physicians alike believed that some kind of periodic "break" from the pill was necessary.
While the early birth control pills provided effective protection against pregnancy, they were far from perfect.
The first combined hormonal oral contraceptive pill contained high doses of both synthetic estrogen and progesterone and use was associated with significant side effects and unacceptable cardiovascular health risks (Dragoman, 2014).
Subsequent modifications have maintained oral contraceptives effectiveness while improving safety. Additionally, the diverse formulations and variations in pill-taking regimens currently on offer provide expanded choices to women.
An overview of the evolution of birth controls across years may be helpful in this section to explain the attitudes of women towards contraception and the reasons behind its poor development. But why the need of birth controls is also called "an unmet need"?

2.2 The US case

The United States Food and Drug Administration (FDA) approved *Enovid*, the first oral contraceptive for the treatment of menstrual disorders in 1957. In the 1960s, the birth control pill ("the Pill") allowed women who were able to obtain a prescription much greater control over

childbearing. For two decades after the Pill was approved for contraceptive use, state laws regulated whether and to whom doctors could prescribe it and access to oral contraception was in large part determined by the state in which a woman resided.

A recent and growing literature in economics examines how changes in state laws regulating the Pill affected a host of women's decisions as well as the well-being of children.

However, the pill was not immediately legally available in all states. The federal Comstock Act [1], which had once prohibited the distribution of contraceptives across state lines, had been invalidated by the time that the pill was introduced. By the 1960s, Comstock laws varied considerably in their scope and applicability to the Pill. 47 of the 48 lower states had enacted anti-obscenity laws, but only 31 states explicitly considered "contraception" among the regulated obscenities.

During the 1960 to 1980 period, states typically restricted legal minors' ability to consent for medical treatment. Unlike today, the legal age of majority in most states was 21 in the 1960s, which prohibited physicians from supplying contraceptives without parental or a guardian's consent.

By 1970s, most states had lowered the age of majority to 18, allowing women aged 18 and over to consent to contraception and, once it was legalized, to abortion as well. Confidential access to contraception and abortion for women under the age of majority continued to depend on the presence of state mature minor doctrines (without being recognized as a legal adult, minors could consent to the Pill if a state had a "mature minor doctrine" (MM)) or other laws granting minors the right to consent to medical care without involving a parent.

We define "age of majority" (AOM) as the moment in which an individual is legally recognized as an adult. Before the ratification of the 26th amendment to the U.S. Constitution, which reduced the federal voting age to 18, some states had different ages of majority for men and women.

In addition to AOM and MM laws, some states codified family planning (FP) laws in a manner that explicitly gave minors legal access to contraception.

It is important to understand how large the behavioral response to the policy is because changes may affect minors' own outcomes as well as outcomes of the next generation. Recent work has shown that women's short and long-term fertility as well as career and labor force outcomes are influenced by access to abortion and/or the Pill.

Additionally, children's outcomes such as educational attainment, welfare use, criminal activity have been associated with access to abortion and/or the Pill (Ananat et al., 2006; Charles and Stephens, 2006; Donohue and Levitt, 2001; Pantano, 2007). Some authors have argued that the impact on the next generation operates via a change in cohort size, while others have argued that the impact is due to a selection mechanism (Ananat et al., 2006; Lott and Whitley, 2007). Still others have questioned the magnitude of the effect on the next generation.

[1] Comstock Act, federal statute passed by the U.S. Congress in 1873 as an "Act of the Suppression of Trade in, and Circulation of, Obscene Literature and Articles of Immoral Use."
Named for Anthony Comstock, a crusader against what he considered to be obscenity, the act criminalized publication, distribution, and possession of information about or devices or medications for "unlawful" abortion or contraception.

Figure 2.3 shows the number of states where minors of a particular age had legal access to the Pill without parental involvement for each year.

In 1973, the landmark Roe v. Wade court decision legalized abortion for adult women, although not necessarily minors, in all states. Prior to Roe v. Wade, some states had reformed laws to allow for abortion under a number of circumstances.

Even after Roe v. Wade, some states continued to enforce the parental involvement component of the existing abortion laws, at least for some period. For example, South Carolina passed a parental consent law in January 1970. Although this law was ruled unconstitutional in July 1973, a new parental consent law was passed in 1974 (Merz et al., 1995; U.S. DHEW, 1974).

		Access Measure					Access Measure		
Year	Age	Pill	Abortion	Both	Year	Age	Pill	Abortion	Both
1968	15	3	0	0	1972	15	14	3	0
1968	16	3	0	0	1972	16	16	3	0
1968	17	3	0	0	1972	17	16	4	1
1968	18	7	0	0	1972	18	32	7	5
1968	19	8	0	0	1972	19	35	7	6
1968	20	9	0	0	1972	20	37	7	6
1968	21	51	0	0	1972	21	51	7	7
1969	15	4	0	0	1973	15	17	14	8
1969	16	4	0	0	1973	16	20	14	9
1969	17	4	0	0	1973	17	20	15	10
1969	18	9	0	0	1973	18	43	42	38
1969	19	10	0	0	1973	19	46	44	42
1969	20	11	0	0	1973	20	46	44	42
1969	21	51	0	0	1973	21	51	51	51
1970	15	6	1	0	1974	15	17	17	8
1970	16	7	1	0	1974	16	20	18	10
1970	17	7	1	0	1974	17	20	19	11
1970	18	13	1	0	1974	18	49	48	47
1970	19	14	1	0	1974	19	51	50	50
1970	20	17	1	1	1974	20	51	50	50
1970	21	51	2	2	1974	21	51	51	51
1971	15	6	2	0	1975	15	21	22	12
1971	16	7	2	0	1975	16	24	23	14
1971	17	7	3	0	1975	17	24	24	15
1971	18	13	5	0	1975	18	50	49	49
1971	19	15	5	2	1975	19	51	51	51
1971	20	17	5	2	1975	20	51	51	51
1971	21	51	5	5	1975	21	51	51	51

		Access Measure					Access Measure		
Year	Age	Pill	Abortion	Both	Year	Age	Pill	Abortion	Both
1976	15	26	26	17	1977	19	51	51	51
1976	16	28	27	19	1977	20	51	51	51
1976	17	28	28	20	1977	21	51	51	51
1976	18	50	50	49	1978	15	27	35	19
1976	19	51	51	51	1978	16	29	35	21
1976	20	51	51	51	1978	17	29	36	22
1976	21	51	51	51	1978	18	50	50	49
1977	15	27	35	20	1978	19	51	51	51
1977	16	29	35	22	1978	20	51	51	51
1977	17	29	36	23	1978	21	51	51	51
1977	18	50	50	49					

FIGURE 2.1: Number of States with minor access, by age of minor and year giving birth
Source: Sources: Alan Guttmacher Institute (2003, 1978); Council of State Governments (1972, 1973); Merz et al. (1995); Paul and Pilpel (1979); Paul, Pilpel, and Wechsler (1974, 1976); and Pilpel and Wechsler (1969, 1971); U.S. DHEW (1974).

2.2.1 The empirical model

Vital statistics data (U.S. DHHS, 1968–1979), U.S. census data (1970–1980), and state-level policy variables are combined into one dataset in Melanie Guldi research (2008).
The birthrate is constructed by dividing the number of births by population (in thousands) for each age, race, and state group constructed. The empirical model exploits a difference-of-difference-of-difference (DoDoD) [2] estimator (Gruber, 1994; Meyer, 1995), which measures the impact of access to abortion and oral contraceptives on the birthrates of young women. Regressions are of the following form:

$$Ln(Birthrate)_{\text{sat}} = \beta_1 + \beta_2 Pill_{\text{sat}} + \beta_3 Abortion_{\text{sat}} + \beta_4 \delta_{\text{s}} + \beta_5 \tau_{\text{t}} + \beta_6 A_{\text{a}} + \beta_7 \delta_7 X \tau_{\text{t}} + \epsilon_{\text{sat}}$$

where s is state of residence, a represents age of mother at birth, and t is the year when the mother gives birth. The dependent variable is the natural log of the number of births per thousand women in an age (see following equation):

$$Ln(Birthrate)_{\text{sat}} = Ln(Numberof Births_{\text{sat}}/(Population_{\text{sat}}/1,000)$$

Access is measured with two variables: $Pill_{\text{sat}}$ and $Abortion_{\text{sat}}$ and is determined by laws in place during the year in which a minor would have become pregnant (year t–1) instead of the year when she would have given birth (year t) to take account of the difference in timing

[2] The method is a quasi-experimental approach that compares the changes in outcomes over time between a population enrolled in a program (the treatment group) and a population that is not (the comparison group). It is a useful tool for data analysis.

between law change and birth outcome. $Pill_{\text{sat}}$ is an indicator equal to 1 if a minor age a in state s in year t was old enough in the previous year to obtain birth control pills without her parent's consent. $Abortion_{\text{sat}}$ is an indicator equal to 1 if a minor of age a in state s in year t was old enough to obtain an abortion without parental consent in year t–1.
Therefore, the author performed the analysis separately by race. Age, state, and year fixed effects, as well as state-year fixed effects (a full set of indicator variables for state and year, fully interacted, that create coefficient vector β_7), are included in all regressions to control for factors that may be correlated with the policy as well as the birthrate. The baseline specification compares different-aged individuals within states using age, state, year, and state-year fixed effects. The data are analyzed using OLS regression, weighted by the population of the state-year-age cell.
By observing summary statistics offered by the author, the estimates indicate that access to oral contraceptives and abortion have similar negative effects on whites' birthrates. In the baseline specification, no statistically significant relationship is found for nonwhite.
Taken together, results presented in the Guldi's research (2008) indicated that abortion access has a larger impact on birthrates than oral contraceptive access; that the magnitude of these results are meaningful; and that the group most affected by these changes are unmarried women experiencing a first birth. Although historical, the results in the study can inform contemporary debate on minors' access to reproductive control.

2.3 Attitudes of women towards contraception

The choice of contraceptive methods has increased in recent years, but the contraceptive pill, first introduced in the 1960s, remains the method of choice for many women in Europe and in the United States of America.
Women could benefit from increased information and advices about contraceptive methods, in order to find the method that better suit their needs and habits.
However, recent researches about women's awareness of methods of contraception and the reasons behind their choices, are limited.
Women aged 25–44 years participated in an online survey in the UK, Germany, Spain, Italy and the USA (Johnson et al., 2013).
A minimum of 500 women were recruited from each country, providing a sample size sufficient to examine use and awareness of contraceptive methods.
Questionnaires were formulated to determine the levels of awareness and usage of a series of methods of contraception. Considering the awareness of different methods of contraception, the question was expressed in three different ways, with two open questions followed by a closed question:

1. 'When thinking about methods of birth control, what one method comes first to your mind?'

2. 'What are all the other methods of birth control you have ever heard of?'

3. 'From the list of birth control methods below, please select the ones you have ever heard of or read about'.

The first and second question are used to determine the degree of awareness of forms of contraception, the third one provides the awareness level of the individual.
The most common contraceptive method used by women in the questionnaires, aged 25-44 years, is the contraceptive pill.

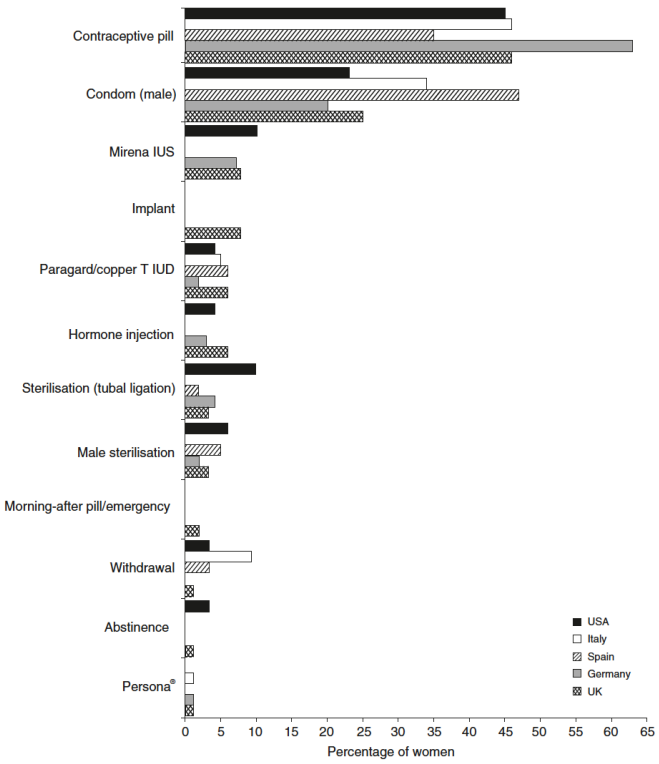

FIGURE 2.2: Country-specific methods of contraception used by women
Source:Johnson et al. Reproductive Health 2013

The diffusion of the contraceptive pill varied between 35% in Spain and 63% (Figure 2.1). The contraceptive pill was the most used method in all countries except for Spain, where condoms are more common.
Overall, almost 80% of women are satisfied about their method of contraception. The most common reasons that lie behind dissatisfaction regarding the use of the pill are the refusal to use hormones, weight gain and mood swings.

Concerning knowledge about the methods, the contraceptive pill was the method most commonly stated as the first to come to mind when thinking about birth control by women in all countries; UK, 72%; Germany, 76%; Spain, 51%; Italy, 59%; USA, 63%.
LARC methods have become increasingly popular in recent years, with the American College of Obstetricians and Gynecologists recommending them as a first-line option for most women

Common side effects experienced with the contraceptive pill,%	(n=202)[c]	(n=117)[c]	(n=189)[c]	(n=114)[c]	(n=198)[c]
Weight gain	51	44	50	51	45
Mood swings	39	35	30	29	38
Headaches	25	26	32	27	26
Irritability	26	26	21	16	33
Change in libido	24	30	30	7	23
Breast tenderness/enlargement	24	26	26	16	22
Short temper	23	11	20	14	24
Migraines	22	21	17	20	14
Pre-menstrual bloating	22	9	14	15	15
Pre-menstrual syndrome	20	13	10	4	20

FIGURE 2.3: Common side effects experienced with the contraceptive pill
Source:Johnson et al. Reproductive Health 2013

seeking to avoid pregnancy (ACOG, 2009).
Long-Acting Reversible Contraceptives (LARCs), namely intrauterine devices and subdermal hormonal implants, are the most effective reversible contraceptive methods available, approximately 20 times more effective than pills, patches, and rings (Curtis et al., 2017).
LARCs are difficult for low-income women to afford, even if they are cost effective in the long run.
Despite the benefits to LARC usage, only 8.5% of women who were using a contraceptive in 2009 were using a LARC (Kavanaugh et al., 2015).
As we will deepen in the next paragraphs, there are several reasons behind this disconnection. The first one is information.

2.4 Unmet need for contraception

Right now more than 19 million women in need live in contraceptive deserts. Contraceptive deserts are defined as counties where the number of health centers offering the full range of methods is not enough to meet the needs of the country's number of women eligible for publicly funded contraception.
Birth controls have health benefits that go beyond pregnancy prevention, too. The medication is often used to treat the symptoms of conditions such as polycystic ovary syndrome, endometriosis, or premenstrual dysphoric disorder.
This is why contraceptive deserts are such a problem.
One obvious question is prompted by the observation in many studies that poor access to the pills is not the only impediment to their use.
Since the 1960s, survey data have indicated that substantial proportions of women who have wanted to stop or delay childbearing have not practiced contraception. This discrepancy is referred to as the "unmet need" for contraception.
An unmet need for contraception exists because there is a cost associated with practicing contraception. The traditional interpretation refers to women that lack of access to contraceptive supplies and services.
Multiple studies, for example, document an unmet demand for LARCs. Henke et al. (2020)

found that the cost is the most frequently cited barrier to LARC usage among low income women, with 53% of low-income women surveyed claiming it was a barrier, compared to only 32% of higher income women.
Burke et al. (2020) shown that 22% of women in 2015-2017 had unsatisfied preferences for contraceptive methods. Potter et al. (2016) found that among women interviewed six months postpartum, two thirds had experienced a barrier to accessing their preferred method of contraception, while Potter and Hopkins et al. (2014) found that 34% of postpartum women using less effective methods would prefer to be using LARCs.
The term "cost" is used by Easterlin (1975) in the broadest sense to include not just expenses for commodities and services, but also health, psychological, and social considerations involved when women decide whether or not to adopt or continue a method. For current users, the benefits of contraception apparently exceed the costs. The reverse is true for women with an unmet need.
Some authors view the lack of access as a primary reason for nonuse among the otherwise motivated (Robey et al., 1993). Where this is the case, increased investment and promotion should provide remedies. However an effective program is one that goes further the provision of family planning and contraceptive services by addressing social obstacles to use, such as fear of side effects and social or familiar disapproval.

2.4.1 Women's point of view about the causes of unmet need

As affirmed by Bongaarts and Bruce (1995) the way to start analysis of the causes of unmet need is with the views expressed by women in response to specific questions included in some surveys. For example, in a number of the DHS surveys, women who are risk of conceiving and did not wish to become pregnant were asked to identify their principal reason for not using contraceptives. The most important reasons for non-use overall are lack of knowledge (25 percent), health concerns (20 percent), and husband's disapproval (9 percent). There are also more reasons such as sex (6 percent), religion (4 percent), and lack of access (4 percent). Generally, the results should be interpreted with caution because they contain several potential problems:
1. *Response error* could result from the need to reply quickly to a complex question in an interview setting. For some women the principal reason given for non-use might well have been different if time had been available to consider the matter more carefully;
2. *The single response* required in the surveys can give a simplistic and incomplete view of what is typically a multidimensional issue. Many women are likely to have more than one reason for not using contraceptives.
3. *Politeness/embarrassment bias* may lead some women to respond inaccurately. For example, women may be embarrassed or too polite to complain about poor family planning services. In these cases, generally more acceptable responses, such as health concerns, could be substituted for the actual reason.
Below, we will review some of the most important causes of unmet need, except for "religion," which is normally not considered easily amenable to intervention.

2.4.2 Lack of knowledge

Lack of knowledge is evidently an important cause of non-use, but what is meant by the term is not entirely clear. Some women identified as lacking knowledge may never have heard of a method, while others may not know how to use it or where to obtain it. There isn't a common definition of knowledge of a method of contraception since it varies among women.
Russo et al. (2013) for example, documented a series of pervasive myths about LARC use, including that they cause disease, infertility, menstrual irregularities, weight gain, acne and hair loss.
Blumenthal et al. (2010) and McNicholas et al. (2014) both demonstrated that when women receive information about LARCs from a doctor, they become more likely to request them.
Women, particularly low-income women, cannot afford to pay the upfront costs and end up using more expensive, less effective methods.
Bongaarts and Bruce (1995) identified a woman with acceptable knowledge of a method as the one that can describe how it is used, its main side effects, and where it can be obtained.
Spontaneous knowledge of a method is measured by asking women whether they have ever heard of a way or a method that a couple can use to delay or avoid pregnancy. Unfortunately, estimates derived from the responses to these questions can be biased. For example, some women can be reluctant to discuss about birth controls with strangers and for this reason they may decide to not to respond even if they know methods and their use.
On the other hand, women may mention a method even though they know only its name.
The impact of these biases are not fully considered and perfectly know, but at least they are partially offset.
Source knowledge is obtained by asking a woman who recognizes a method where she would get the method if she wanted to use it.
Recognition of methods is obtained by reading a brief description of each method and then asking women whether they recognize the method. Measures based on this question are likely to overestimate knowledge because some respondents may be embarrassed to admit they have never heard of any method, leading them to overstate the number they recognized.
Knowledge of side effects is obtained by investigation about the main problem, if any, with use of particular methods. This question produces a range of responses, including "no problem." In some countries, a significant proportion of women did not provide a response or opinion, presumably because they were not sufficiently familiar with the method.

2.4.3 Concerns about health and side effects

Extensive epidemiological research over the past years indicates that health concerns and side effects of contraceptive methods play a predominant role.
Among women who express a concern or report a problem regarding the three most frequently used methods (the pill, the IUD, and sterilization), health concerns are expressed with greater frequency than any other problem.

The research has produced a detailed understanding of the prevalence and significance of the major and minor health effects of contraceptive methods. For this reason all current methods may have some undesirable effects that are likely to discourage adoption by some potential users. Therefore, choosing a method is clearly not a simple matter because it involves weighing a variety of drawbacks to find the method that is least objectionable.
The impact of health perceptions on method used varies among societies depending on the amount and accuracy of information available to potential users. Information about methods may be obtained by different sources: from friends, from the mass media, by reading magazines or books and by discussion with family planning providers. In many developing countries, especially poor ones, some or all of these channels are lacking or far from satisfactory. As a combined consequence of poor information levels and inadequate services, a large amount of women may not be sufficiently knowledgeable about the health effects of methods to make an informed and comfortable decision about contraception.

2.4.4 Objections from husband

For many married women, objections to family planning from their husbands (or partners) would be a sufficient reason not to practice contraception despite their own desire to do so.
The DHS did not include follow-up questions to identify the reasons for husbands' objections. Among several possibilities, such objections may often be based on conflicting reproductive intentions. If a husband wants more children and the wife does not, disagreement about the practice of contraception would be expected.

2.5 Family planning programs

Family planning programs are now widely considered a key part of any comprehensive development strategy.
The international consensus on this issue is reflected in the UN Millennium Development Goals, specifically the MDG5 target of providing universal access to reproductive health by 2015. The 2012 London Summit on Family Planning, organized by the UK government and the Bill and Melinda Gates Foundation, strengthened political commitments and raised new funds, thus reaffirming the role of family planning in the global development agenda. The existence of substantial unmet need for contraception and large numbers of unplanned pregnancies has provided the main rationale for investments in family planning programs by governments (Singh and Darroch 2012).
Flynn (2022) builds on a large literature which demonstrates how family planning access can lead to selection which impacts the health outcomes of the cohorts of children being born.
A number of studies [3] found evidence that access to abortion (considered as a form of contraception) reduces infant mortality, with Grossman et al. (1981) going so far as to say 'the

[3] Pabayo et al. (2020), Corman et al. (1985), Joyce (1987) and Gruber et al. (1999).

increase in the legal abortion rate is the single most important factor in reductions in both white and nonwhite neonatal mortality rates'.
Access to family planning services has been shown to have far reaching impacts on health and economic outcomes for both mothers and their children, with these effects varying considerably across different forms of contraception.
As previously highlighted in this research, Myers (2017) found that the liberalized access to abortion in the US in the 1970s gave agency to many young women in deciding if and when to get married and have children.
The primary aim of family planning programs is to satisfy the demand for contraception and thereby to reduce or eliminate unmet need. Establishing the direct impact of a program on unmet need is complex, however. Bongaarts (2014) concluded unequivocally that a family planning program having a substantial information, education, and communication (IEC) component can, on average, reduce unmet need by 10 percent and raise contraceptive use by 22 percent.
As highlighted by Bongaarts (2014), past studies about this subject led to two hypotheses concerning the potential role of family planning programs. First, these programs can reduce unmet need by reducing obstacles to use and by providing access to contraceptive methods and services. This line of reasoning is the most widely accepted for these programs. Second, programs may produce a rise in the demand for contraception by implementing information, education, and communication (IEC) campaigns that promote ideas about the benefits of contraception.
This effect is suggested by diffusion theory and it is supposed to operate in addition to the influence of socioeconomic variables on demand for children.
The recent growth in investments in family planning programs is to a large extent based on the existence of an unmet need for contraception and on the assumption that such investments reduce unmet need.

2.5.1 An overview of LARC family planning programs

The Title X Family Planning Program is a federal grant program created in 1970 to provide comprehensive and confidential family planning services and preventive health services. Services provided include contraception counseling and provision, breast and cervical cancer screenings, testing and treatment for sexually transmitted infections, and pregnancy diagnosis and counseling.
Title X provides vital services to many Americans. According to the Family Planning Annual Report: 2016 National Summary, "Title X providers serve a vulnerable population, most of whom are female, low income, and young. In 2016, Title X-funded providers served more than 4.0 million family planning users (i.e., clients) through almost 6.7 million family planning encounters."
The Colorado Family Planning Initiative: in 2009, the Colorado Department of Public Health and Environment (CDPHE) implemented the Colorado Family Planning Initiative (CFPI) with

the goal of reducing unintended pregnancies in Colorado by increasing the number of family planning clients served and by increasing access to LARC methods.
Iowa Initiative to Reduce Unintended Pregnancies:in 2007, The Iowa Initiative to Reduce Unintended Pregnancies (IIRUP) was launched. The IIRUP was a privately funded campaign aimed at reducing unintended pregnancies among women aged 18 to 30. Similar to the CFPI, the IIRUP was implemented through Title X family planning agencies, which operated 81 clinical sites across 46 of Iowa's 99 counties.
St. Louis Contraceptive CHOICE Project:also in 2007, Washington University in St. Louis launched the St. Louis Contraceptive CHOICE Project (SLCCP) in order to study the contraceptive choices women make when cost and access barriers are removed and they are educated about the benefits of different contraceptive methods.
While these three different initiatives have many differences in the populations they are serving and the scale and scope of their operations, they have several important characteristics in common that are useful for the purposes of this study. They all reduce the cost barrier of LARC methods to low-income women by providing LARC insertions free of charge. In response to each program there is an uptick in the number of LARCs being used (Flynn, 2022).

2.6 Oral contraceptive non-contraceptive health consequences

The story of pill safety would not be complete without a discussion of the non-contraceptive health consequences that have been associated with the use of the pill.
Education regarding the non-contraceptive health benefits of OC can encourage women to use them consistently and correctly. Many women remain unaware of classic OC non-contraceptive benefits even if new advantages have been reached in terms of experience and research.
Educating healthcare providers and women about these important non-contraceptive health benefits will result in increased compliance, greater continuation, and fewer unintended pregnancies.
The majority of women in the study developed by Andrew M. Kaunitz were unaware of the protective benefits of OC. It is particularly disturbing that women's awareness has not improved over time, even among those who are well educated.
Clinicians have an huge effect on attitudes and knowledge regarding the pill. According to survey conducted by the Henry J. Kaiser Family Foundation, 63% of adults rely on healthcare professionals for information about birth controls.
As women pass through different stage of their reproductive life, each contraceptive method offer them a different combination of risks and benefits. As their needs, options and preferences change over time, women must reevaluate their choice of contraceptive: experts and doctors here have a key role in addressing women to their most suitable and right choice, taking into consideration not only contraceptive but also non-contraceptive consequences.
Women need to consider several factors when choosing a method: their aspirations about childbearing, their sexual behavior, their individual and family health history, their health habits and,

perhaps most important of all, their willingness and ability to use a particular method consistently and correctly.
Since pregnancy can affect women's health in a variety of ways, the prevention has a significantly beneficial effect on women's health.
As Kost et al. had already observed in 1991, the virtual elimination of pregnancy related complications by the most effective contraceptive methods (the pill, the IUD, long-acting hormonal methods and sterilization) is a benefit often overlooked when the health effects of methods are considered.
The reality of people's lives and of the methods available today make clear the continuing need for the development of new methods of contraception that will involve fewer trade-offs between purposes.
However, whether women (and in general, couples) are able to achieve their family planning goals in good health depends not only on the contraceptive method, but also on the behavior of the individuals who use it.
Behavioral change is a goal difficult to reach, but an important first step would be to encourage more honest, direct consideration of the extent to which one's behavior interacts with the health effects of contraceptive methods. Women and men need to be more honest with themselves and with each other about possible exposure to sexually transmitted diseases that may have long-term consequences for each other's health and for the women's future fertility.
A better understanding of how current, or future, behaviour might affect health and influence the effects of a contraceptive method can help women and men make more reasonable choices about their behavior and select methods that are better tailored to their own concerns and goals.

Chapter 3

Empirical investigation of contraceptive policies in Europe

3.1 Introduction

When the contraceptive pill was introduced in Europe between 1960s and 1970s, it changed enormously the way women made decisions about childbearing, education, labour force participation, by offering more control over fertility (Myers, 2017).
Recently, a growing literature has examined the connection between hormonal contraception and mental health effects, focusing on depression, suicidal tendency, irritability that may increase vulnerability to subsequent episodes of major depression and other psychiatric disorders in older age (Skovlund et al., 2016).
Studies investigated how the interaction between two hormones progesterone and estrogen may trigger depressive symptoms and generally, it is what most of the hormonal contraceptives are made up. The results could lead to a worrying contradiction about the access to the pill and between liberalizing fertility control and worsening women's mental health.
In this study, according to the existing literature, we estimate the effect of the contraceptive pill on education and income in light of the considerations done about the relationship between pill access and mental health effects.
Recent literature and in particular, Myers (2017), raised the debate about the importance of the pill relative to the access to abortion, showing that the pill effect is considerably lower than the one of abortion. It is important to highlight that there is an overlap in timing between the access to abortion and the legalization of the pill across states. Also abortion, such as pill, may have important mental health implications on women. One main contribution of this study, compared to previous evidence, is that among the consequences emerged, the focus is mainly on the economic point of view rather than on the medical one and on the interaction between the two.
First, we conduct an estimate on the effects of the pill legalization across some selected European countries on women aged between 18 and 25 (from 1917 to 1983) which is a cohort that differently experienced the introduction of the pill during the adolescence period.
Second, we investigate the effect of the hormonal contraceptive on income and education: in the first step we do not take mental health into consideration in order to observe the consequences of its introduction at a later time. The key question is whether the access to the pill increases

the long-term investments in education. As Bailey (2010) shown, the turning point is the effect on the timing of childbirth rather than changes in fertility.
Steingrimsdottir (2016) proved that the access to the pill pushes women to enroll in more ambitious occupations and careers, making large investments in education. Goldin and Katz (2000) explored the diffusion of the birth control pill among young college graduate women in U.S. and although the pill was approved in 1960 it did not diffuse among young women until late 1960s. In an influential paper, Goldin and Katz exploited the variation in state policies governing young women's legal right to consent to contraceptive services.
Using a difference-in-difference framework, they estimate that college graduates women who could legally consent to the pill before reaching age 18, they were more likely to pursue graduate education. Subsequent studies adapted their identification strategy "the power of the pill", in order to develop additional evidence in the role of the pill to increase educational attainment. Moreover, an expansive empirical literature estimated the causal effects of policies governing young women's confidential and legal access to contraception and abortion. A recent evolution of this literature takes a more critical point of view toward the very large role of the contraceptive pill claimed by the studies above.
Myers (2017) addressed the relative importance of access to abortion versus access to the pill and argued that the effect of the pill is considerably smaller than the one of abortion, if existent at all.
Lastly, this paper is more broadly related to findings from the literature that identifies the effect of hormonal contraceptive use on mental health, labor market participation and education (Valder F., 2022). According to this author, this research deals with two areas of public health: mental health and reproductive one.
Epidemiological research on the prevalence and incidence of depressive symptoms and unipolar depressive disorders has consistently shown a preponderance in women compared with men. Hammarström et al. (2009) shown that the problem of mental illness is around two times higher for women. In a scientific evaluation of research on depression, the Swedish Council on Technology Assessment in Health Care came to the conclusion that hormonal factors could have some effect in contributing to women's increased risk for depression.
On the other side, also reproductive health received a relevant overview, mostly related to abortion bans in U.S. states.
A growing number of U.S. states are moving to restrict access to abortion amid speculation that the Supreme Court will overturn the 1970s ruling that established the right to terminate pregnancies nationwide.
On June 2022, The Supreme Court of U.S. overturned Roe v. Wade landmark, removing nearly 50 years of federal protections for abortions and giving states the right to make the procedure illegal within their jurisdictions.
The ruling doesn't just change who in the U.S. can get an abortion and where, it affects when, how and under what circumstances people become parents, which could have long-term impacts on their personal lives and careers.

The court's decision threatens to reverse gains American women have made in the workforce, Carole Joffe, a sociology professor at the University of California, Davis, who studies reproductive health, tells CNBC Make It. In a working research paper published last year, Kelly Jones, an economics professor at American University, looked at state abortion regular data and determined that a total elimination of abortion access would reduce women's college degree attainment by 5.6%.

Recently, Coleman, Coyle et al., (2009) published an analysis finding that US women who reported having had an abortion had higher rates of several mental health disorders as diagnosed according to the guidelines of the Diagnostic and Statistical Manual III Revised (DSM III-R, American Psychiatric Association, 1987).

For this reason, increasing barriers to abortion make contraception of even greater importance. Healthy contraception is also important in light of the gender imbalance in the bearing of potential mental health costs. While both, men and women benefit from the fertility control function, only women bear the potential costs (Valder F., 2022).

Research on psychological aspects of abortion revolves around two main questions: (1) Does abortion harm women's mental health? and (2) What personal and contextual factors influence post-abortion adjustment? Published literature answering the former question often uses trauma theory (Lee, 2003; Reardon, 1987; Robinson, Stotland et al., 2009; Speckhard, 1985). As alternative Steinberg Finer (2011) proposed the common-risk-factors approach.

Steinberg et al. (2014) stated that in published literature, two main streams appear. The first describes abortion as a trauma like war or rape and consequently associated to mental health problems comparable to post-traumatic stress disorders.

This framework originally found support from interviews with small numbers of women specifically recruited because they deemed their abortion a highly stressful experience (Speckhard, 1985). One study conducted in 2009, concluded that abortion led to 12 different mental health problems. Although the study reported that mental health problems were determined after abortion, this was not the case. Instead, lifetime mental-health diagnoses and lifetime abortion experience were correlated with one another, meaning that this study did not assess whether the abortion came before or after the mental-health outcome.

Sounder research examined the association between abortion versus birth and subsequent mental health, controlling as needed for other confounding factors. The simple association between abortion and subsequent mental-health disorders including mood, anxiety, substance use disorders, and suicidal intention appears open to alternative explanations (Steinberg and Rubin, 2014).

This study contributes to "the power of the pill literature" focusing on the relationship between health outcomes and economic factors. The "power of the pill" literature was started by Goldin and Katz (2000) providing evidence that trends such as the delay of marriage and higher rates of female college enrollment in professional programs coincided with the initial diffusion of the pill. The key underlying mechanism is that access to the pill reduces the price and increases the returns to (long-term) investment into education, by lifting both the penalty of abstinence and

the uncertainty of pregnancy costs (Valder, 2022). Steingrimsdottir (2016) demonstrated that women with access to the pill were more likely to enroll in programs leading to more ambitious occupations and higher wages.
Moreover, larger investments in education will result in higher labour force participation and incomes.

3.2 Legalization and access to the pill

To observe the mental health effects that follow the introduction of the pill, we select some European countries since consent access varies across states.
Following the literature, there are two different forms of access for young women. The first is legal access, determining whether a method was legally available but young unmarried women were not able to consent themselves and needed the consent of their parents. The second form of access is consent access. With this type of access, women were able to consent themselves and did not need parental consent. The "power of the pill" literature considers consent access to be the more relevant type of access.
In this study, differently from U.S. ones, we do not make this difference due to the lack of literature concerning birth controls across Europe. Data on the usage of the pill are, however, scarce. Moreover, alongside the possibility to access to the pill, there are some obstacles that are equally important: in fact, the cost of the pill at introduction was very high resulting in a little use and in a high cost of birth control. In addition to the pill, alternative forms of contraception existed at that time such as condoms, for example. But these barrier methods were also expensive and in contrast to the pill needed to be applied before intercourse and thus represented a higher variable cost of fertility control. They also had a higher failure rate than the pill (Bailey, 2006).

3.3 Data

Data for this study are drawn from the easySHARE survey which samples individuals aged 50+ from the European countries.
The Survey of Health, Ageing and Retirement in Europe (SHARE) is a research infrastructure for studying the effects of health, social, economic, and environmental policies over the life course of European citizens and beyond. From 2004 until today, 530,000 in depth interviews with 140,000 people aged 50 or older from 28 European countries and Israel have been conducted. Thus, SHARE is the largest pan-European social science panel study providing internationally comparable longitudinal micro data which allow insights in the fields of public health and socioeconomic living conditions of European individuals.
Nonetheless, our dataset cames from EasySHARE that is stored as a long format panel dataset

covering respondents from all SHARE countries and hence it is very suitable for teaching longitudinal as well as country-comparative analyses.
EasySHARE includes the same number of observations as the main release of SHARE but is restricted to a subset of variables. It contains all waves of SHARE and includes variables out of a variety of the SHARE CAPI-modules (CAPI stands for Computer Assisted Personal Interview) and in some instances the drop-off questionnaires that collect additional information via self-completion of a paper pencil questionnaire. Furthermore, adaptations in easySHARE make the file more comparable with the US Health and Retirement Study (HRS).
The age structure of the data is ideal since it covers women born early enough to be exposed to the early diffusion of the pill.
The figure 3.1 is an overview of the development of all CAPI samples in Wave 8 until suspension of fieldwork in mid-March due to COVID-19.

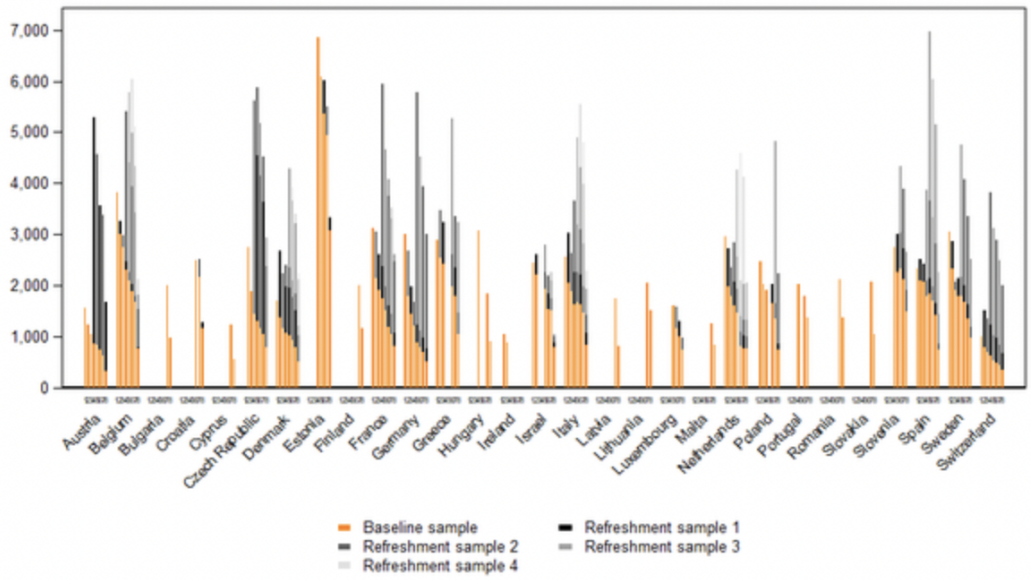

FIGURE 3.1: Development of all CAPI samples in Wave 8 until suspension of fieldwork in mid-March due to COVID-19 Source:Brunnermeier et al., 2016

We construct information on access to the pill for each individual using the information on respondents' year of birth and the state they lived in.
Release 8.0.0 of the regular Wave 8 CAPI data covers for the third time after Waves 4 and 6 the items on the respondents' social network. Additionally, new modules on saving regrets (SR module) and time expenditure (TE module) were introduced in Wave 8. For the first time, SHARE also contains accelerometer data measuring respondents' physical activity in a subset of countries.
Due to the lack of data about the introduction and legalization of the contraceptive pill across the European countries, we decide to select only five on which we found complete information (Table 3.1). These countries are Italy, Spain, Netherlands, Germany and France.
We select women of wave 8 (2019-2020) to obtain the most recent information: this yields an

estimation sample of around 6159.

Access to the Pill in selected European Countries	
Country	Year of introduction
Italy	1971
Spain	1978
Netherlands	1964
Germany	1961
France	1967

TABLE 3.1: Access to the Pill in selected European Countries
Source: author's own elaboration

We focus on access between age 18 and 25 for several reasons. First, it is the range of age in which changes in access to the pill occurred. Moreover, in this age period, individuals make important decisions concerning the investment of capital.
Kessler et. al (2005) demonstrated that the period considered is crucial for the formation of mental health, since mental health is particular weak and malleable to external influences.
Skovlund et al. (2016) believed that adolescence may be a critical time for the development of depression in girls, as the sex gap in the incidence of depression dramatically increases during this period.
When documenting the link between contraceptives and mental health, Skovlund et al. (2016) also founded larger differences in incidence rates of depression between users and non-users of hormonal contraceptives for adolescent women aged 15-25 compared to all women.
HCs (hormonal contraceptives) provided an effective option for contraception and family planning. Although this suggests that HC use is beneficial for many women, there is a subset of women who suffer severe mood-related side effects.
Relying on Danish Registry data, Skovlund and colleagues recently reported a link between antidepressant prescription and HC use. The authors included data from more than one million women in the age of 15–34 years, who were using combined estradiol/progestin as well as progestin-only HCs in all available forms of administration. In those women, risk ratios for first diagnoses of depression or first antidepressant use increased during the first 6 months after initiation of HC-use.
Epidemiological data suggest that hormonal transition periods across the female lifespan, such as puberty, are windows of heightened risk to develop depression, comprising a possible reproductive subtype of depression.
Table 3.2 shows the intensity of treatment of women of the five European countries.
On the left we have the years between 0 and 7 that are the years included in the range 18-25.
We create the variable *treatment_intensity* in order to observe the number of years that women benefit from the introduction of the pill. It is important to keep in mind that the coefficients represent the change in access from 0 to 7 years. Indeed, we divide the variable into 7 ranges in

YEARS OF PILL ACCESS DURING ADOLESCENCE (18-25)

Legal access by country					
Years	*Italy*	*France*	*Germany*	*Netherlands*	*Spain*
0	40%	30.34%	8.22%	15.38%	74.86%
1	3.70%	3.25%	1.89%	2.66%	3.47%
2	5.43%	2.35%	2.61%	2.56%	3.31%
3	3.13%	2.70%	2.22%	2.94%	2.89%
4	2.72%	3.52%	2.35%	1.71%	2.40%
5	2.30%	3.73%	2.81%	3.23%	2.32%
6	3.29%	3.66%	3.13%	3.23%	3.56%
7	39.42%	50.45%	76.76%	68.28%	7.20%

TABLE 3.2: Table presents the distribution of the number of years that women in the selected sample had access to the pill in the easySHARE dataset, separated by country. Sample restricted to women of ages between 18 and 25.

order to identify how many years from 0 to 7, women take effectively advantage.

The table 3.2 presents the distribution of the number of women in the selected sample had access to the pill in easySHARE. Sample restricted to women with mental health information available.

Around 40% of women did not benefit from the access to the pill in Italy and almost the 75% in Spain. The result can be justified by the late introduction of the pill in the countries (1971 Italy and 1978 Spain). Otherwise, in Germany, 76% of women fully benefit from the introduction. About 70% also in Netherlands and 50% in France.

In a similar way we construct a variable for the legalization of abortion across European countries.

A priori, the effect of access to abortion on mental health is ambiguous and is widely discussed in public debates and in the medical profession. After collecting data concerning abortion legalization and decriminalization across countries, we create the variable *abortion*. In order to make it comparable with the intensity of treatment that originates from the access to the pill, the structure of the variable follows that of the previous one. It represents the fraction of years between 18 and 25 in which women are able to take benefit from abortion legalization.

Despite that, we provide an overview of the timeline of abortion legalization in Europe (Figure 3.2).

For each country, the period when abortion was/is illegal is highlighted in purple, and the period after abortion was legalized or decriminalized is highlighted in pink.

It is equally interesting observing a global view about opinions on abortion in 2021 by country (Figure 3.3).

Later, we include it as additional control variable in the estimations.

However, for our analysis, we decide to select only those countries for which we had the data concerning the introduction of the pill also for analyzing abortion effects, in order to realize a coherent comparison between them.

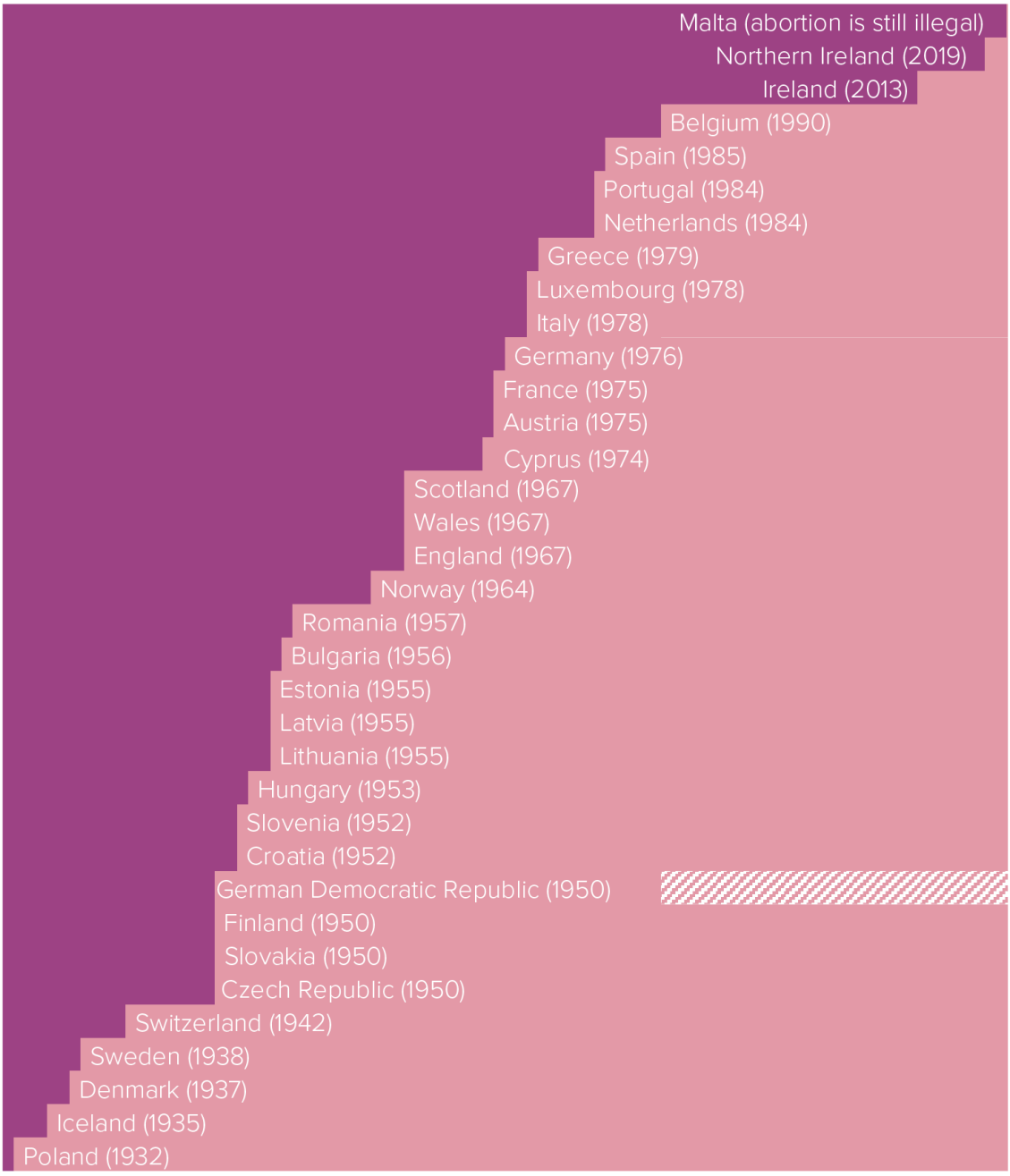

FIGURE 3.2: Abortion legalization and decriminalization. Source:Center for Reproductive Rights, Ipsos.

3.4 Mental health and education measures

To estimate the effects of the pill and abortion on mental health, we use different measures. In easySHARE dataset, a measure for depressive symptoms is based on the EURO-DEPRESSION (Euro-D) scale, a standardized measured designed for international comparisons of depressive symptoms in Europe. It is constructed as a composite index of twelve items: depressed mood, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness. The scale ranges from 0 “not depressed” to 12 “very depressed”.

The EURO-D score is included in the SHARE questionnaire and consists of individual responses to a set of twelve questions inquiring about an individual’s recent mood, with a negative

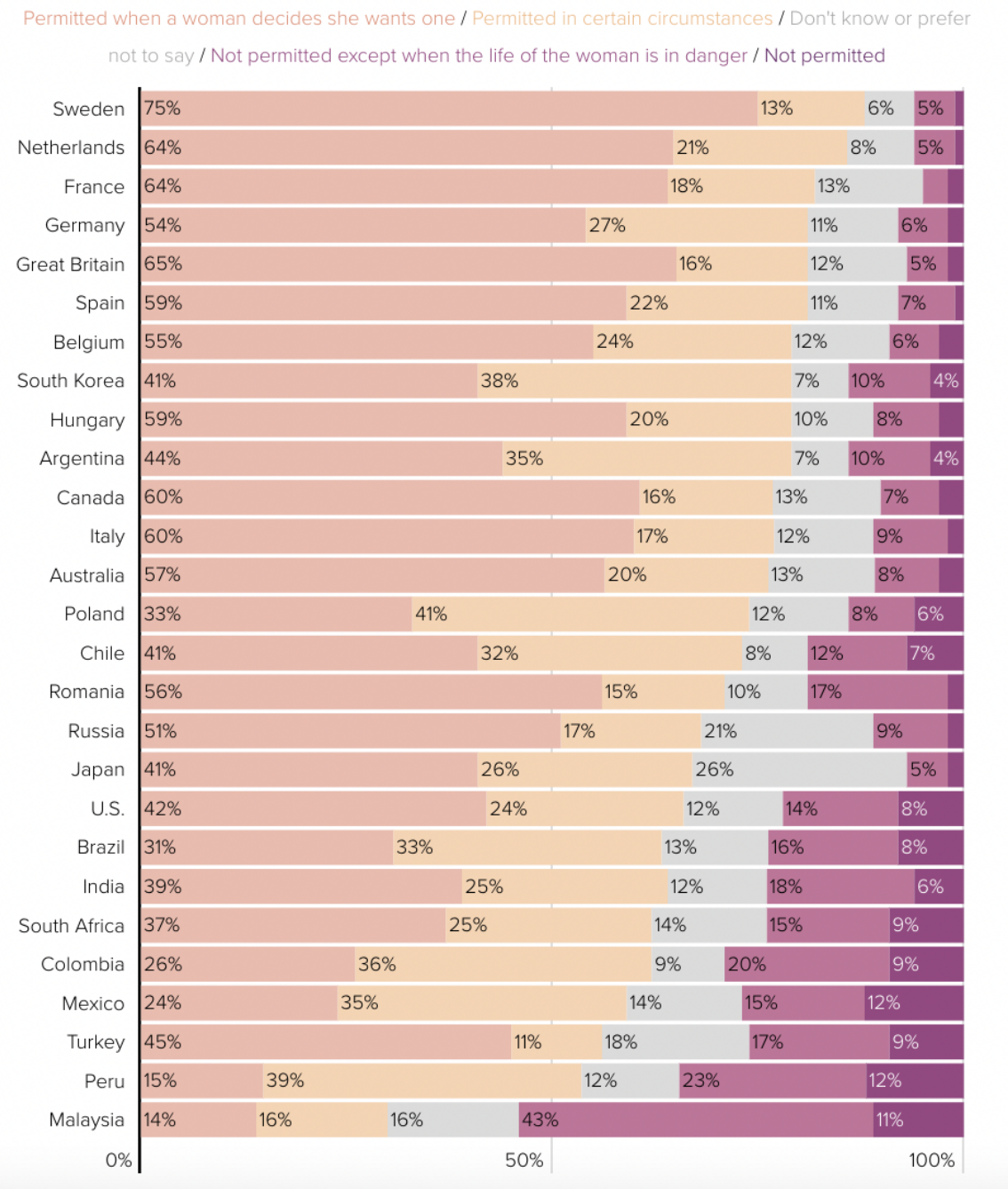

FIGURE 3.3: Global view on abortion rights

answer to four or more questions understood to indicate clinically relevant depression.
It corresponds to the U.S. CES-D score that is used in HRS. Center for Epidemiological Studies Depression (CES-D) scale, developed by Radloff (1977), has been used in the economic literature for the assessment of mental health in several life situations, such as bereavement (Siflinger, 2017), response to family health shocks (Rellstab et al., 2020), improved access or coverage of mental health care (Ma and Nolan, 2017; Ayyagari and Shane, 2015), and experience of major recessions (McInerney et al., 2013).
CES-D score contains six negative and two positive items. Negative items are feeling depressed, sad, restless, alone, feeling that everything is an effort and that one could not get going. Positive items are feeling happy and enjoying life.

Differently from our Euro-D scale, it ranges from 0 to 8.

Table 3.3 shows the descriptive statistics of the main variables in the analysis. The average eurod score is 2.29, with a standard deviation of 3.92. This can be interpreted with the consideration that, in this dataset, women report on average 2.25 points of depressive symptoms. The other variables included in the analysis are listed in the same table: for each variable, description, mean and standard deviation are provided.

Descriptive statistics of main variables

Variables	*Description*	*Mean (SD)*
eurod	The EURO-D symptom scale measures the current depression and it is a composite index of twelve items: depressed mood, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness. The scale ranges from 0 "not depressed" to 12 "very depressed".	2.3(3.9)
income	Member net income, imputed	15739.3(14249.1)
ln(income)	Ln of net income	9.3(1.1)
edulevel	Level of education according to ISCED classification	1.64(0.88)
treatment_intensity	Number of years between 18 and 25 in which women were able to take benefit from the introduction of the pill	0.6(0.4)
abortion	Number of years between 18 and 25 in which women were able to take benefit from the legalization of abortion	0.2(0.4)
age	Age (years)	71.1(9.7)
country	Country identifier (country=16 Italy, country=17 France, country=12 Germany, country=14 Netherlands, country=15 Spain)	14.8(1.9)
iv009_mod	Contains information on the area of the building where the interview took place. 1: A big city, 2: The suburbs or outskirts of a big city, 3: A large town, 4: A small town, 5: A rural area or village	3.56(1.3)
q_income	Income quartiles	2.5(1.1)
mar_stat	Marital status	2.5(2.4)
chronic_mod	Number of chronic diseases (easySHARE version)	1.1(1.3)
smoking	Smoke at the present time	4.6(1.3)
BMI	Body mass index	24.7(9.3)

TABLE 3.3: Descriptive statistics of main variables

Later, we investigate the effect of the pill on education (Appendix B provides an overview of the years of education in the selected countries). To estimate the educational level, we used the information of easySHARE, more precisely, we used the ISCED classification, where the variable *isced1997_r* stores the ISCED coding of education. We reorganize the variable creating ranges of educational levels. For ISCED=0 there is no education level; for ISCED=1,2 (first and second stage of education) we have primary education; for ISCED=3,4 (secondary education and post-secondary non-tertiary education) we have secondary level of education and for ISCED=5,6 (first and second stage of tertiary education) we have tertiary education.

3.5 Empirical strategy

We define pill access as *treatment_intensity* and as an exposure measure for the years between age 18 and 25.
We estimate the effect of the access to the pill for woman *i*, living in a state *s* and born in year *t* with the following equation:

$$eurod_{\mathrm{i,s,t}} = \beta_0 + \beta_1 treatment\_intensity_{\mathrm{i,s,t}} + \beta_2 abortion_{\mathrm{i,s,t}} + \beta_3 x_{\mathrm{i,s,t}} + u_{\mathrm{t}} + v_{\mathrm{s}} + \epsilon_{\mathrm{i,s,t}}$$

What we are interested in is β_1 , as well as the effect of the access to the pill on women mental health. The variable represents the fraction of the seven years between age 18 and 25 in which a woman was able to take advantage of the introduction of the contraceptive. We estimate the equation using OLS.
OLS assumes that the functional relationship between dependent and explanatory variables is linear in parameters, that the error term enters additively and that the parameters are constant across individuals *i*.
In every specification, we control for access to abortion, by adding the fraction of years between ages 18 and 25 in which woman *i* has access to abortion.
Indeed, we control for differential access to abortion[1] captured by β_2. We also include age, a variable that contains information on the area of the building where the interview took place *(iv009_mod)*, income quartiles and a series of cohort and state fixed effects $(u_{\mathrm{t}}, v_{\mathrm{s}})$.
Ideally one would insert other covariates that contribute shaping mental health, such as education and fertility outcomes. However, in this case, it has been shown empirically by the "power of the pill" literature that the pill affects education and fertility decisions.
Indeed, several studies observed that the variables that may influence and shape mental health are several. For this reason, from easySHARE we select some variables to include as additional controls: *marital status*, *chronic diseases* and habit of *smoking*[2].
Later, we repeat the analysis by investigating the effect of the pill access on education level and member income, considering mental health consequences, and including same controls as

[1] We create the variable *abortion* as well as *treatment_intensity*: both represent the number of years between 18 and 25 in which women were able to take benefit from the introduction of the pill and the legalization of abortion. For inference, one additional year of access has to be divided by 7.

[2] *Marital status* is asked only in the baseline interview; in regular waves the respondents are asked if their status has changed or not. It can assume values from 0 to 6 (0=none, 1=married and living with spouse, 2=registered partnership, 3=married and living separated from spouse, 4=never married, 5=divorced, 6=widowed.
Chronic_mod variable is based on multiple answer question that asks which of the listed chronic conditions the respondents had according to their doctors ("Has a doctor ever told you that you had…"). The following list shows the conditions included in the index: heart attack, hypertension, stroke, diabetes, chronic lung disease, high blood cholesterol, Parkinson disease, cataracts, hip fracture, stomach or duodenal ulcer. *Smoking* indicates whether the respondents smoke at present time.

before [3].

$$Y_{i,s,t} = \alpha_0 + \alpha_1 treatment\_intensity_{i,s,t} + \alpha_2 abortion_{i,s,t} + \alpha_3 x_{i,s,t} + u_t + v_s + \theta_{i,s,t}$$

In the next regression we control for mental health index, *eurod*.

$$Y_{i,s,t} = \delta_0 + \delta_1 treatment\_intensity_{i,s,t} + \delta_2 abortion_{i,s,t} + \delta_3 x_{i,s,t} + \delta_4 eurod_i + u_t + v_s + \theta_{i,s,t}$$

The comparison has the aim to demonstrate how taking mental health into account may change the effect of the pill on net income and education.

3.6 The mental health effects of access to the Pill

Differently from the majority of literature studying mental health effects of the pill and according with what we said previously, this research focuses mainly on the economic effects of the pill introduction.
Valder F. (2022) shown, after distinguishing between consent and legal access, that the consent access to the pill is associated with worse self-reported mental health.
As opposite, in our investigation, regressions show that one additional year of treatment reduces *eurod* depressive symptoms by 0,85 given that the *eurod* scale ranges from 0 "not depressed" to 12 "very depressed". The effect is extremely statistically significant.
By observing the controls included in the investigation (table 3.4), the area where the interview took place is statistically significant for the different p-value levels. It is interesting to observe the effect of the variable *chronic_mod*. It involves a list of chronic conditions the respondents had: heart attack, stroke, diabetes, chronic lung disease etc. Accordingly with the main literature concerning the mental health effects of the contraceptive pill, suffering already for a mental/physical disturb, may further sharpen an existing critical mental health condition.
Indeed, several studies shown that suffering already from a chronic physical disease leads to a worsening of the mental condition. The variable *chronic_mod* is extremely statistically significant and increases the depressive symptoms by 0.394.

Access to abortion, as well, is associated with better self-reported mental health and the result is statistically significant. Differently from the pill impact observed by Valder F. research, but in accordance with him concerning abortion, the access to abortion choice has a positive impact on mental condition. It reduces the probability of suffering from *eurod* depressive symptoms by 0.658. These results proceed upstream with the rest of the literature. The main interpretation of this positive effect is related to the benefits that the consent to abortion give to women, as well

[3] In this specification we remove income quartiles since these would lead to bad controls. Bad controls are variables that are outcome of the treatment itself.

as, the power of birth control.

It is reasonable, even if our research is mainly focused on observing economic consequences, to relate findings to medical literature to explain why usually the effect of the pill is so damaging. Liao and Dollin (2012), as highlighted by Valder (2022), reported that the first available pill contained around 9.5 milligrams (mg) of progestin while pills today contain only 0.1-3 mg. Estrogen levels were also much higher with 150 mg for the first pill, compared to 20-50 mg for the pill today.

Lewis et al. (2019), shown that more than one million women in age 15-34, who were using combined estradiol/progestin as well as progestin only hormonal contraceptives suffered the risk for first diagnoses of depression during the first 6 months of initiation.

Rubino-Watkins et al.(1999) used several psychological inventories administered to 29 oral contraceptive pill (OCP) users and 47 non-users to show an increase in the level of anger and depression among the hormonal contraceptive users. Ross et al. (2001) found OCP users had higher levels of neuroticism.

Increasing body mass index (BMI) is also recognized as a risk factor related to the pill. This variable is based on individual weight (ph012_) and height (ph013_), and is calculated according to the formula: BMI = (ph012_/(ph013_)*2)*10 000. The variable is part of the gv_health module in the SHARE main release.

2016 data analysis of among Ethiopian adult women of reproductive age revealed that there is a significant association with oral contraceptive access and BMI. However, when Mayeda et al. (2014) reported the weight and body composition changes during oral contraception among obese and normal weight women, the findings revealed that OCs (Oral contraceptives) are not associated with short term weight or body composition change for normal weight women and suggest that OCs also are not associated with short term weight or body composition change in obese women. In line with this, BMI is still included to ensure it still was not a confounder in the analysis (Artic University of Norway, 2001).

For this reason, we decide to provide an analysis of the impact of the pill on BMI (table 3.5): what we observe is that the effect is statistically significant, reducing the individual weight and improving the overall mental well-being.

In this specification, the different education levels have a notable impact on the BMI coefficient, being statistically significant for levels of education that are primary and secondary.

The variable *Smoking* here, shows that a bad habit has negative impact on physical health. It increases by 0.34 the BMI. Indeed, its effect is statistically significant.

	(1)
	EURO-D
	OLS
treatment_intensity	-0.858***
	(0.221)
abortion	-0.658***
	(0.203)
age	-0.099***
	(0.011)
big city	-0.151
	(0.207)
large town	-0.202
	(0.198)
small town	-0.316***
	(0.176)
rural area	-0.451***
	(0.176)
primary education	0.038
	(0.203)
secondary education	0.026
	(0.225)
tertiary education	-0.189
	(0.236)
2nd_income quartile	-0.047
	(0.141)
3rd_income quartile	-0.149
	(0.149)
4th_income quartile	-0.334
	(0.159)
mar_stat	0.020
	(0.026)
n° of chronic conditions	0.394***
	(0.040)
smoking	-0.003
	(0.039)
country FE	*Yes*
N	*6159*

TABLE 3.4: Mental health effects of access to the pill
***,**,* indicate statistical significance at 1%, 5%, and 10%, respectively.

	(1)
	BMI=body mass index
	OLS
treatment_intensity	-2.046***
	(0.502)
abortion	-3.924***
	(0.462)
age	-0.342***
	(0.025)
big city	-0.628
	(0.471)
large town	-0.417
	(0.450)
small town	-0.894***
	(0.402)
rural area	-0.944***
	(0.401)
primary education	1.429***
	(0.463)
secondary education	1.221**
	(0.512)
tertiary education	0.185
	(0.537)
2nd_income quartile	-0.181
	(0.322)
3rd_income quartile	0.088
	(0.340)
4th_income quartile	-0.506
	(0.361)
mar_stat	0.041
	(0.060)
n° of chronic conditions	0.822***
	(0.092)
smoking	0.343***
	(0.088)
country FE	*Yes*
N	*6159*

TABLE 3.5: BMI=body mass index
***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

3.7 Education and income

The key part of this study is to examine the impact that the access to the pill has on education and income (table 3.6 and 3.7). Large part of "the power of the pill" literature has documented positive relationship between pill and labour market outcomes. Literature says that the large fertility control offered by the pill allowed women to make large investments in education.
As Valder suggests, mental health can be interpreted as the hidden cost of fertility control.
First, we create from easySHARE dataset of variables, *net_income* in order to evaluate the impacts on net income of each member. The variable represents the level on net income of each member. For simplicity, in the regression we use the natural logarithm. When dealing with income level or economic value, the numbers are generally large. The logarithm has the effect of descaling effect of the large number for ease of handling. Secondly, we estimate the effect of the pill on net income of each member (first column) and in a second step we add mental health as a control (second column).
Column (1) of table 3.7 shows that the access to the pill is associated with a reduction in member income by a huge amount. When including the measure for mental health in column (2), the effect of the pill on net income becomes slightly larger even if is not statistically significant for the analysis.
These results suggest that part of the increase in the reduction of net income of each member due to the pill can be attributed to the mental health effects of the contraceptive. It thereby supports the hypothesis that the pill has affected productivity negatively due to its mental health effects.
We conduct a regression analysis to evaluate the effect of the pill on years of education. As dependent variable we use *eduyears_mod* that represents the years of education. In particular, the years of education are only asked in the baseline interview of each respondent starting in wave 2. Because this question was not asked in wave 1 and 3 the answers collected in waves 2, 4, 5, 6, 7, and 8 were assigned.
Table 3.6 shows the estimates on education, controlling for the same variables as before and adding in the second column the eurod variable. The effects are not statistically significant but we decide to provide a graphic representation and a detailed description below in order to better understand the effects and the proved results provided by the literature.

As highlighted in figure 3.4, the effect on education is positive. We decide to show graphically the effect on education of the access to the pill controlling for the access to abortion, age, and area of location. With area of location, we investigate on the area of the building where the interview took place. It is filtered if the interview was not conducted in the respondents´ home. Additionally, information was transferred from the household respondent to the other household members. (1: A big city, 2: The suburbs or outskirts of a big city, 3: A large town, 4: A small town, 5: A rural area or village).
The benefit given by the pill is represented by the improved control over fertility that allow women to focus on their studies and future opportunities. Empirical studies that show negative

	(1) *eduyears_mod*	*(2)* *eduyears_mod*
	OLS	*OLS*
treatment_intensity	0.066	0.041
	(0.389)	(0.390)
abortion	-0.334	-0.353
	(0.359)	(0.359)
age	-0.186***	-0.189***
	(0.019)	(0.019)
big city	-0.987***	-0.983***
	(0.368)	(0.368)
large town	-0.438	-0.443
	(0.351)	(0.351)
small town	-1.651**	-1.659***
	(0.313)	(0.313)
rural area	-1.269***	-1.280***
	(0.311)	(0.311)
mar_stat	0.260***	0.261***
	(0.037)	(0.037)
n° of chronic conditions	-0.184**	-0.173*
	(0.071)	(0.072)
smoking	0.267***	0.268***
	(0.068)	(0.068)
eurod		-0.027
		(0.022)
country FE	*Yes*	*Yes*
N	*6159*	6159

TABLE 3.6: Effects on years of education
***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

correlation between pill access and mental health, demonstrate that poor mental health has detrimental effects on education.

Previous literature established a positive effect of the pill on education and labor market outcomes due to its fertility control function. Moreover, studies argue that the improved control over fertility due to the pill enabled women to make large investments in education.
Early access to the pill potentially affected women's lifecycle labor supply by reducing the costs and increasing the returns to pursuing careers (Bailey, 2005).
Early access reduces the cost of delaying pregnancy and facilitates the possibility of making career investments. Young women can stay in labour market, invest in education and be sexually active without the risk of pregnancy. Moreover, early access increased the expected lifetime returns to career investments by making the timing and number of spells out of the market a deterministic process (Bailey, 2005). Finally, early access may have increase labour supply even among women that do not have aspirations about their careers.
For instance, women may have worked more to help their husbands gain more education or reach a certain career stage to increase lifetime consumption (Happel et al., 1984).
This means that estimates from literature were a combination of both fertility controls and mental health effects. While the fertility effect of the pill increases education, the mental health effect reduces these. This is also reflected by the negative coefficient of *eurod* score on education (table 3.7). The composite effect in the literature thereby slightly underestimates the fertility effect since it includes the effect of mental health costs.

A number of influential studies have established that the legalization of oral contraceptives (the pill) in the US had significant effects on women's fertility and career decisions (Goldin and Katz, 2002; Bailey 2006, 2009; Guldi, 2008; Hock, 2007).
Women who were given access to contraceptive technologies attained higher levels of education and delayed their first marriage and fertility. Moreover, simply lowering the cost of oral contraception has been found to increase the age at first childbearing, and lower overall fertility in the affected group of women (Bailey, 2011; Kearney and Levine, 2009). In short, better and cheaper access to contraception improves women's socio-economic standing (Madestam and Simeonova, 2012).
Quicker access to the pill both increases the human capital of future mothers and improves the chances that their children will be "wanted", the long-term benefits of better access to contraceptive technologies might significantly exceed the short-term gains usually measured by reductions in the abortion rates and the education and the career benefits accruing to affected women.

	(1) *ln(income)*	*(2)* *ln(income)*
	OLS	*OLS*
treatment_intensity	-0.228***	-0.231***
	(0.055)	(0.055)
abortion	-0.116*	-0.118*
	(0.050)	(0.050)
age	-0.007**	-0.008**
	(0.002)	(0.002)
big city	-0.132***	-0.132***
	(0.052)	(0.052)
large town	-0.060	-0.061
	(0.049)	(0.049)
small town	-0.074	-0.074
	(0.044)	(0.044)
rural area	-0.087***	-0.088***
	(0.044)	(0.044)
primary education	0.097	0.097
	(0.051)	(0.051)
secondary education	0.392***	0.391***
	(0.056)	(0.056)
tertiary education	0.651***	0.650***
	(0.058)	(0.058)
mar_stat	-0.005	-0.004
	(0.006)	(0.006)
n° of chronic conditions	-0.005	-0.004
	(0.010)	(0.010)
smoking	0.008	0.008
	(0.009)	(0.009)
eurod		-0.003
		(0.003)
country FE	*Yes*	*Yes*
N	*6159*	6159

TABLE 3.7: Effects on net income
***, **, * indicate statistical significance at 1%, 5%, and 10%, respectively.

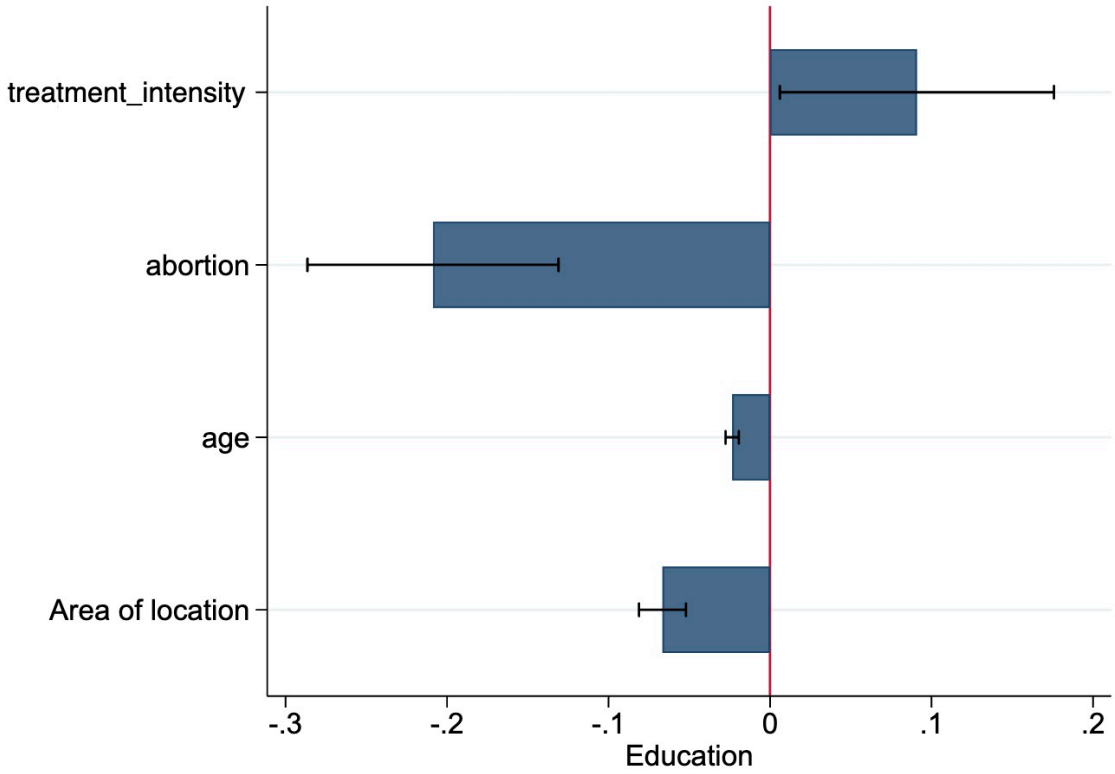

FIGURE 3.4: Plots coefficients of the effects of education on years of pill access (treatment_intensity) controlling for abortion, age and area where the interview took place. Source: Author's own elaboration

3.8 Maternity leave benefits

Among the possible explanations given to the increase of depressive symptoms among women, other than the contraceptive pill, there is the scarce attention to the risk of developing psychiatric disorders around childbirth. In fact, the long-term impact of maternity leave policies on well-being of women is not fully understood (Avedano et al., 2015).

Although few studies have examined the impact of maternity leave policies on women's mental health, Brockington (2004) observed that these policies have long term effects on mothers' health, by reducing the stress around childbirth.

Ruhm (1998, 2000) defined maternity leave as the period granted to mother linked with childbirth.

The prevalence of late life depressive symptoms among European women ranges from 18% to 37% (Castro-Costa et al., 2007). What this data want to highlight is that several studies observed that the incidence of depressive disorders is higher on women compared with men. Different explanatory models have been suggested such as psychological, hormonal, cultural etc.

According to this author, two main theories provided the basis to link mental health of women to their employment/education and fertility decisions. The first one is the so called "scarcity hypothesis" (Coser, 1974; Gooede, 1960; Slater, 1963). This theory prescribes that the demand from work and family lead to role overload, that may increase the perceived stress, generating the process of "stress proliferation".

However, he affirmed, maternity leave may mitigate the stress coming from role overload during childbirth, but leave entitlements may incentivize mothers to maintain multiple roles, increasing consequently, the amount of stress.
In alternative, the "enhancement" hypothesis states that multiple roles improve well-being by increasing the sources of identification. These benefits from work may offset the stress associated with combining family and work roles (Grzywacz and Bass, 2003).
Recent research has found that participation in multiple work had positive effects on mental health.
The study conducted by Avedano et al. (2015) uses, as our study, data from SHARE. Their analysis focuses on Western European countries. They excluded Poland, Czech Republic and women living in East Germany before 1989: women in these countries were exposed to a system of full, but not freely chosen, employment (Gal and Kligman, 2000), so that maternity leave decisions were not comparable to those of women in Western countries.
As measure of mental health, they use the same Euro-D score that we use in our study.
SHARE participants were asked to report each paid job that lasted for 6 months or more since leaving full-time education. Participants were also asked to report details of each natural child including date of birth, gender. Subsequently, participants were asked whether and for how long they had stopped working when each child was born.
Using an indicator of generosity (FWW) showing the number of weeks of full wage leave provided to mothers, they show that, over time, countries' regimes switch from less to more generous. To investigate on the impact of maternity leave benefits, they use the difference in difference approach, comparing trends between control (not in employment during childbirth) and treatment groups (employed during childbirth).
Their results suggest that depressive symptoms that tend to damage women at older ages can be mitigated or avoided by an appropriate maternity leave legislation.
A possible explanation is that maternity leave benefits reduce the risk of mental health problems shortly after childbirth, which may in turn reduce the risk of future episodes of depression in older age. Previous economic research on maternal employment has focused on understanding how maternal employment after childbirth impacts children's health and development.
Chatterji and Markowitz study (2008), extended this literature by examining the effects of both maternal and paternal leave after childbirth on the health of mothers. The results suggest that longer maternity leave from work, both paid and unpaid, is associated with declines in depressive symptoms, a reduction in the likelihood of severe depression, and an improvement in overall maternal health.

3.9 Final considerations

This study has some methodological drawbacks. First of all, the lack of information about mental status preceding the contraceptive access prevented us from establishing a temporal relationship between contraceptive access and the onset of psychiatric symptoms.
Another limitation arises from the self-reported quality of mood and psychological well-being assessment. Furthermore, a structured interview was used to assess the presence of a psychological disturb.
Strengths of this study include the nation-wide, population-based nature of the sample and the good response rate: relatively good generalization of the results is possible.
However, in this research, we deepen mental health costs of one of the most influential discoveries of the twentieth century: the contraceptive pill. Medical studies suggest a link between hormonal contraception and depression.
In contrast to the majority of literature that highlights the negative side effects of contraception, we focus the lens on the economic related effects.
After providing evidence of the link between mental health and contraception, we demonstrate the importance of this interaction for the effect of the pill on education and member and couples' labor market participation.
As highlighted in figure 3.4 and following the literature trend, there is a positive effect of the pill on education due to its fertility control.
Adding the measure of mental health and estimating the effect of contraception on member net income, current research suggests that, on the other side of the coin, the pill affects productivity negatively due to its mental health effect.
From the policy point of view, the results may change decisions about reproductive health. What these studies suggest is that is important not to underestimate mental health effects of contraceptives, comparing them with their aim to be fertility controls.
Even if the relative effects of birth controls are positive in our research, being upstream with respect to the literature, the concerns about their effects are growing.
To confirm this growing trend about the searches for pill side effects, we provide a list of figures in the appendix (From A.1 to A.5). They reflect a growing awareness about the potential effects of the pill in all the European countries selected for the research.
However, the role of birth controls is crucially considering the increasing debate and barriers to abortion that are affecting nowadays.
Policies that control mental health have to consider the negative side of birth controls, especially in light of the tendency of women with respect to men to suffer from mental health disturbs and particularly considering their importance in labour productivity.
Findings may have important implications in terms of costs of medical care, productivity of women and social impact of women's mental health on economy and society.

Conclusions

In this work we investigate the long-term mental health and economic consequences of a health technology considered to be one of the most powerful of the 20th century: the contraceptive pill.

While previous researches mainly focused on liberalizing education and labour market outcomes, the literature focusing on mental health concerns is scarce but with perspectives of growth. This is mainly due to the discovery of the link between mental health disorders such as depression and hormonal contraceptive use.

Opposite to the the main results in literature, our research shows that one additional year of contraceptive treatment, reduces depressive symptoms by 0.85. We proceed upstream because we focus our attention on the economic consequences of the pill introduction but without omitting to relate findings to medical literature, able to explain why the contraceptive pill is interpreted to be so damaging.

Indeed, after providing evidence for a link between access to the pill and mental health, we investigate the importance of this link for the effect of the pill on education and labor market outcomes.

Due to its fertility control, the effect of the pill on education is positive. Adding the measure of mental health and estimating the effect of contraception on member net income, current research suggests that, on the other side of the coin, the pill affects productivity negatively due to its mental health effect.

From a policy perspective, the results can inform decision-making processes in the area of reproductive health. It seems important to carefully balance the potential mental health effects for the prescription of hormonal contraceptives against their fertility control effect and to compare these to non-hormonal contraceptives.

Nowadays the role of contraceptives became even more relevant given the increasing barriers to abortion in the US. For policies related to mental health and the labor market outcomes, our research reports a productivity cost of economic effects of the pill. This is important to acknowledge, especially in light of gender differences in the prevalence of mental health problems and in their impact on labor market productivity of the partner and of the couple itself, which may potentially accentuate gender wage gaps.

Appendix A

Empirical investigation of contraceptive policies in Europe

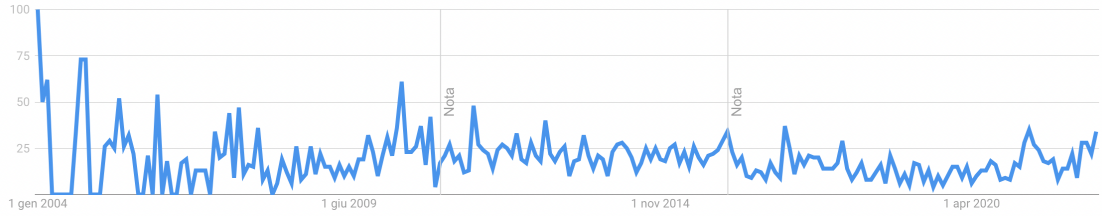

FIGURE A.1: Google Trends: searches for term “pill side effects Italy"
Source:own configuration from Google Trends
This figure depicts google searches in relation to the highest point for between January 1st 2004 - June 2022. A value of 100 reflects the highest popularity of searches for the term “pill side effects”.

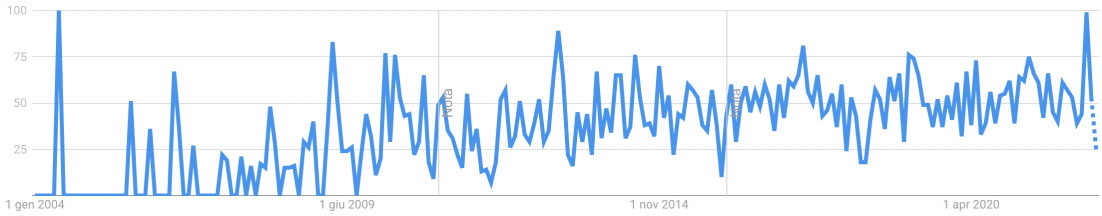

FIGURE A.2: Google Trends: searches for term “pill side effects France"
Source:own configuration from Google Trends
This figure depicts google searches in relation to the highest point for between January 1st 2004 - June 2022. A value of 100 reflects the highest popularity of searches for the term “pill side effects”.

FIGURE A.3: Google Trends: searches for term “pill side effects Spain"
Source:own configuration from Google Trends
This figure depicts google searches in relation to the highest point for between January 1st 2004 - June 2022. A value of 100 reflects the highest popularity of searches for the term “pill side effects”.

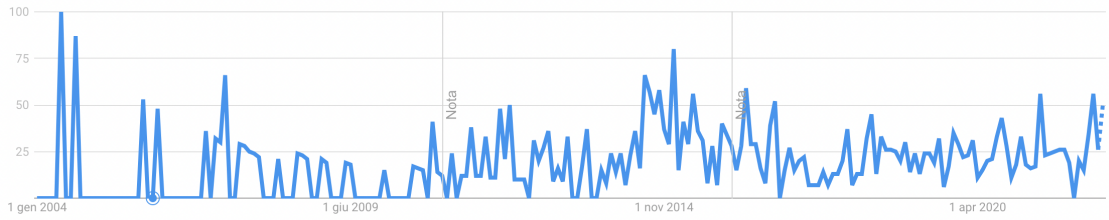

FIGURE A.4: Google Trends: searches for term “pill side effects Netherlands"
Source:own configuration from Google Trends
This figure depicts google searches in relation to the highest point for between January 1st 2004 - June 2022. A value of 100 reflects the highest popularity of searches for the term “pill side effects”.

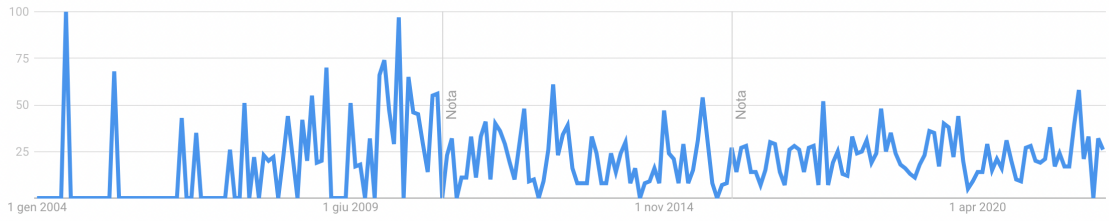

FIGURE A.5: Google Trends: searches for term “pill side effects Germany"
Source:own configuration from Google Trends
This figure depicts google searches in relation to the highest point for between January 1st 2004 - June 2022. A value of 100 reflects the highest popularity of searches for the term “pill side effects”.

Appendix B

An overview of the educational levels across countries

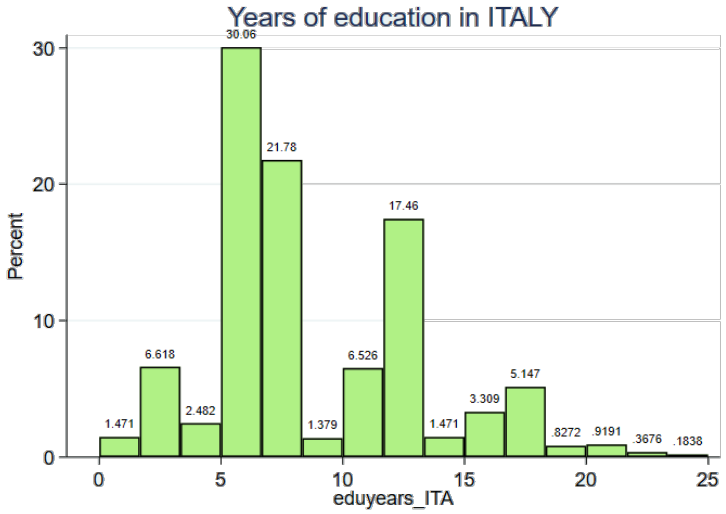

FIGURE B.1: Years of education in Italy. Source: author's own elaboration

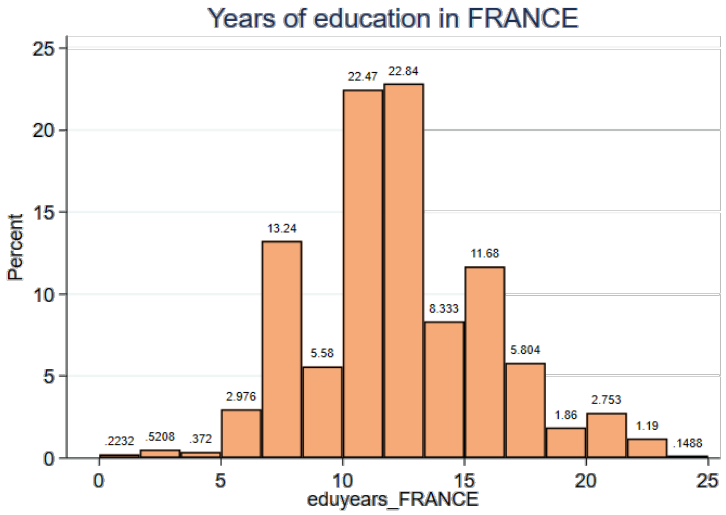

FIGURE B.2: Years of education in France. Source: author's own elaboration

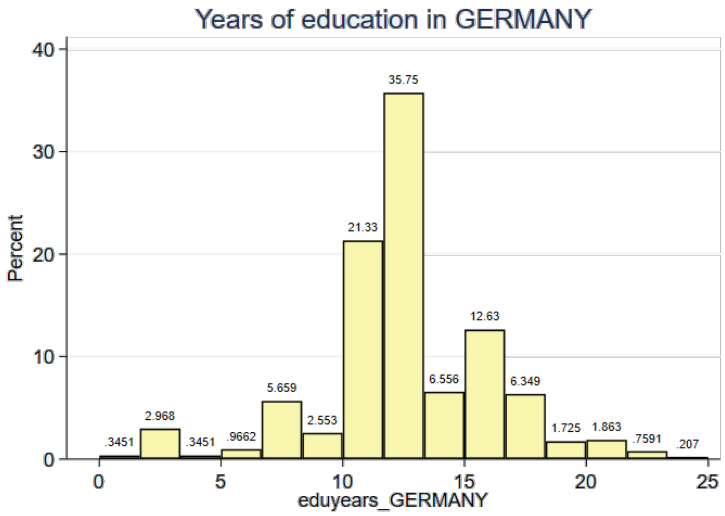

FIGURE B.3: Years of education in Germany. Source: author's own elaboration

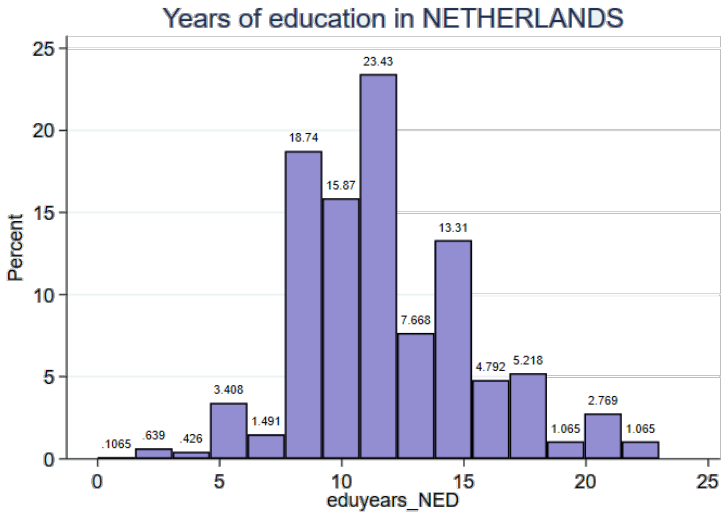

FIGURE B.4: Years of education in Netherlands. Source: author's own elaboration

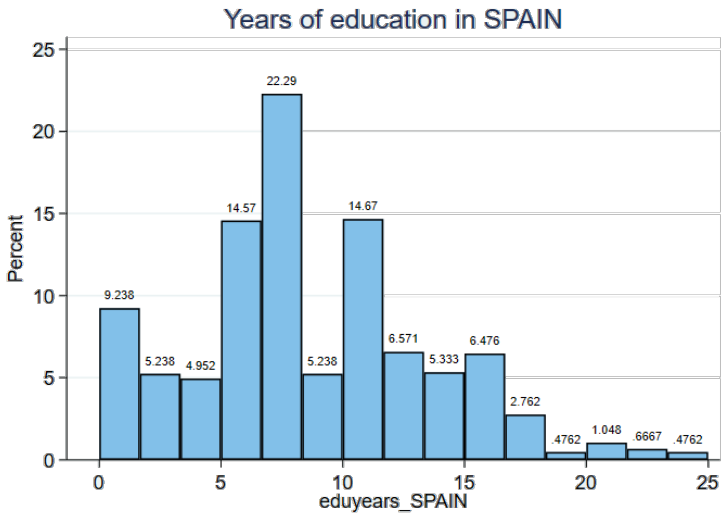

FIGURE B.5: Years of education in Spain. Source: author's own elaboration

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