Will a Shrink Make you Richer?

Cozzi, Guido; Galli, Silvia; Mantovan, Noemi

European Economic Review

DOI:
10.1016/j.euroecorev.2017.10.005

Published: 31/10/2018

Peer reviewed version

Will a Shrink Make you Richer? Gender Differences in the Effects of Psychotherapy on Labour Efficiency*

Guido Cozzi†, Silvia Galli‡, and Noemi Mantovan§

September 25, 2017

Abstract

This paper provides a first theoretical and empirical analysis of the effects of psychotherapy on individual productivity. We build a simple model in which a deterioration of mental health endogenously causes a decrease in productivity, which is counterbalanced by psychotherapy. We test our hypotheses on the British Household Panel Survey data. We find that individuals suffering from mental health problems benefit economically from consulting a psychotherapist. Moreover, we find that the returns are higher for men than for women, even though women are more likely to seek help.

Keywords Psychotherapy; Gender Differences; Mental Health; Wage Gap.
JEL Codes I12; J16; J31.

1 Introduction

Mental health problems are very common and have a detrimental effect on personal income and the overall economy. However, psychotherapy can reduce the negative effects of mental health issues and increase productivity. Surprisingly, the effect of psychotherapy on future income has never been investigated by economists. This paper offers the first theoretical and empirical study of the effects of consulting a psychotherapist on labour income. Moreover, our analysis shows gender differences both in the rate of help seeking and in the returns

*We would like to thank Koen Bartels, Robert Sauer, an Associate Editor, and two Referees for their very useful suggestions.

†University of St.Gallen. Institute of Economics (FGN-HSG), Varnbüelstrasse 19, St. Gallen. Email: guido.cozzi@unisg.ch

‡University of St.Gallen. Institute of Economics (FGN-HSG), Varnbüelstrasse 19, St. Gallen. Email: silvia.galli@unisg.ch

§Bangor University, Business School, College Road, Bangor. Email: n.mantovan@bangor.ac.uk

generated by consulting a psychotherapist. If psychotherapy can mitigate the effects of mental health problems on productivity, it should have a substantial impact on personal income as well as on the whole economy.

Mental health problems affect a big share of world population, and the UK is no exception: it is estimated that one in four people in England experiences mental health problems in any given year (McManus et al. 2009). Poor mental health has strong effects on poverty as well as the overall economy, with an estimated 70 million days of work lost in the UK each year and £24 billion cost for employers. Moreover, mental health problems are the first reason for losing days of work (Mental Health Foundation, 2016) and a leading cause of productivity losses even when employees are physically at work (see Lerner and Henke, 2008, for a review of the literature).

On the other hand, awareness of mental health problems is on the rise and consulting a psychotherapist is becoming more common in the UK. The Health and Social Care Information Centre (HSCIC) reported in the Mental Health and Learning Disabilities Statistics (MHLDS, 2016) that over 970,000 people were in contact with a mental health or learning disabilities service in 2015. However, there is still a stigma associated with asking for help, as only 2 in every 5 people experiencing a mood, anxiety or substance use disorder report seeking assistance in the year of the onset of the disorder (WHO & ICPE, 2000). Therefore, even though help seeking for mentally-related problems is becoming more frequent, people are still shy or unable to ask for help. The stigma persists despite the fact that psychotherapy would dramatically improve the quality of life of patients suffering from anxiety and depression, with effects comparable to being administered pharmacotherapy (Cuijpers et al. 2013). Moreover, psychotherapy could help individuals to be more productive (Lam et al. 2013), and might reduce the negative effect of mental health problems on income.

This paper aims to shed light over the effect of psychotherapy on future income. Our work is linked to the new strand of literature that studies the connection between income and health (Bockerman and Ilkmakunnas 2009, Clark and Oswald 1994, Clark 2003, Schmitz 2010), and in particular the effects of income on mental health (Gathergood 2012, 2013). At the same time it strongly differentiates from the existing literature since we are interested in the other causal direction: how an improvement in mental health, through the help of a psychotherapist, impacts personal income.

In our setup we distinguish between personal psychological problems and problems arising from work-related stress. We do not assume that psychotherapy eliminates personal troubles, but we assume that it can reduce them and help the individual to be more productive. At the same time we theorize that undertaking psychotherapy is costly: both from a pecuniary point of view and from a social norm point of view. The former depends on the availability of psychotherapists in the area where the person lives, as well as the opportunity cost of losing time that could be spent working or enjoying leisure. The latter is, instead, an inner cost and will depend on the social stigma associated with psychological help seeking. Social norm costs can vary among individuals, and

the psychology literature suggests that they are much stronger for men than for women (Mackenzie et al. 2014). Our theoretical model shows that having psychological problems (whether private or work related) is a positive predictor of the same period's psychotherapy choice. Moreover, stress related to work is a positive predictor of future period's income rise. Finally, consulting a psychotherapist when the overall stress level does not rise is a predictor of lower future income.

We also study the effect of psychotherapy on productivity from an empirical point of view. We use British Household Panel Survey (BHPS) data, following individuals from 1995 to 2008. We perform fixed effects estimates (FE) that allow to control for personal characteristics, since some individuals might be more prone to suffer from mental health problems. In the FE analyses we concentrate on individuals who suffer from mental health issues and find that consulting a psychotherapist has a positive impact on future income. Moreover, the FE estimates show that even though women are more likely to consult a psychotherapist, they receive a lower percentage increase in income than men. While men can expect a 12.4% increase in income, women's expected increase in income is 8.1%. This has an effect on the overall income: we find that for individuals with mental health problems, consulting a psychotherapist accounts for 2.4% to 2.7% of the unexplained part of gender wage gap. These results are confirmed by a series of robustness tests and alternative models. Finally, in the Appendix we present instrumental variable fixed effects (IV FE) estimates.

Research in psychology shows that mental health problems are not gender neutral: women are reported to suffer more from anxiety and depression compared to men (McLean et al. 2011), which explains why women are more likely to consult a psychotherapist. However, including only individuals who suffer from mental health problems in the sample and controlling for the residual level of mental health should remove any difference in the amount of men and women who consult a psychotherapist. Moreover, the fact that women tend to be more prone to anxiety and depression does not explain the difference in returns. The psychology literature offers two explanations. First, men tend to seek less help for health problems because of a stronger inner and outer stigma; this means that even if they have the same symptoms as their female counterparts, they will be less likely to consult a psychotherapist (Addis et al. 2003, and Mackenzie et al. 2014). Second, discrimination against women is very common in the workplace and has a strong impact on women's health (Landrine et al. 1995, Elwér et al. 2013). If the source of mental health distress is gender discrimination in the workplace, it is less likely that an health improvement in the psychological status will cause an increase in income.

Our findings have strong policy implications. An increase in the availability of psychotherapy in the UK would benefit labour income and therefore potentially reduce poverty and welfare benefits. At the same time a reduction of the stigma associated with help seeking and an increase in psychological support for the victims of gender discrimination in the workplace might diminish the wage gender gap substantially.

The rest of the paper is organized as follows. The next section formulates

the model. Section 3 describes the data and reports descriptive statistics. Section 4 presents FE estimates. Section 5 shows the robustness of the results to alternative specifications. Section 6 shows and discusses the gender earnings gap decomposition. Section 7 reports the conclusions.

2 The economy

We consider a simple economy in which population is constant, there is one active individual per-family, and the total mass of families is normalised to one. Each individual, indexed by $i \in [0,1]$, lives for infinitely many periods, cares about consumption, c_{it}, and suffers stress. Stress has two sources: labour effort, e_{it}, and personal trouble, τ_{it}. Personal trouble depends on psychological traumas individuals may receive in their childhood as well as throughout their life. While the individual can freely choose his/her level of labour effort e_{it}, eliminating personal trouble is impossible. However, it can be reduced by psychotherapy expenditure.

The assumed utility functional is:

$$\sum_{t=0}^{\infty} \beta^t u_{it} = \sum_{t=0}^{\infty} \beta^t \left[c_{it} - \frac{1}{2} \left(e_{it} + \frac{\tau_{it}}{\delta \chi_{it}} \right)^2 \right], \tag{1}$$

where $\beta \in (0,1)$ is the discount factor, $\delta > 0$ is a personal trouble parameter, and χ_{it} is the intensity of psychotherapy in period t [1].

Utility functional (1) assumes that individuals have to spend psychological efforts, which renders labour effort harder: if people's minds are occupied with dealing with their mental issues, all productive works will have to come on top. The quadratic form in overall stress $e_{it} + \frac{\tau_{it}}{\delta \chi_{it}}$ implies that the marginal disutility of productive effort e_{it} increases with the current level of psychological trouble τ_{it}. The chosen formulation also allows for decreasing returns to psychotherapy effectiveness.

The cost of psychotherapy, measured in terms of final good, is

$$C(\chi_{it}) = d_{it} \chi_{it},$$

[1] We could have assumed that previous period psychotherapy affects current period's stress, that is a one period utility function such as

$$u_{it} = c_{it} - \frac{1}{2} \left[e_{it} + \frac{\tau_{it}}{\delta \chi_{it-1}} \right]^2.$$

Our predictions would not have changed, while our empirical fit would have increased.

where d_{it} measures the difficulty of finding good psychotherapists, as well as the pecuniary equivalent of a social stigma on psychotherapy[2]. For example, a scarcer presence of psychotherapists in the country would increase the average distance from customers, and raise travel costs from home to a psychotherapist.

In every period the labour income of individual i depends on the previous period productive effort as

$$y_{it+1} = A_{it+1} e_{it}, \tag{2}$$

where A_{it+1} is the productivity of effort, assumed to be known at time t.[3]

We assume for simplicity that individuals cannot access credit, hence they consume all their period's income:

$$c_{it} = y_{it}. \tag{3}$$

It follows that individuals will choose optimal labour effort, e_{it}, to maximise

$$\beta A_{it+1} e_{it} - \frac{1}{2}\left[e_{it} + \frac{\tau_{it}}{\delta \chi_{it}}\right]^2. \tag{4}$$

which gives

$$e_{it} = \beta A_{it+1} - \frac{\tau_{it}}{\delta \chi_{it}}, \tag{5}$$

hence productive effort increases with the individual work ability and decreases in the unproductive stress level. Notice that the overall level of stress $e_{it} + \frac{\tau_{it}}{\delta \chi_{it}}$ is equal to the expected, discounted productivity of effort, βA_{it+1}.[4]

Notice that eq. (5) implies that, given their psychotherapy choice, χ_{it}, individuals will accept more stress when they expect the productivity of their productive efforts to be higher. Hence they get more under pressure. Conversely, the higher their inner psychological trouble τ_{it} the lower the productive share of their effort, and, by (2), the lower their future income.

We can now solve for the individual decision about psychotherapy:

$$\begin{aligned} \chi_{it}^{*} &= \arg\max_{\chi_{it}} \beta A_{it+1}\left[\beta A_{it+1} - \frac{\tau_{it}}{\delta \chi_{it}}\right] - \frac{\left(\beta A_{it+1}\right)^2}{2} - d_{it}\chi_{it} \\ &= \left(\frac{\beta A_{it+1}\tau_{it}}{\delta d_{it}}\right)^{\frac{1}{2}}. \end{aligned} \tag{6}$$

[2] Under our assumptions, the limiting case of no psychotherapy, that is $\chi_{it} = 0$, is excluded, but this is without loss of generality. In fact, no major changes would follow if we had assumed $u_{it} = c_{it} - \frac{1}{2}\left[e_{it} + \tau_{it}\left(\delta\chi_{it} + 1 - \chi_{it}\right)\right]^2$ and $C(\chi_{it}) = \frac{\chi_{it}^2}{2} d_{it}$. Our main text choice is only motivated by analytical simplicity.

[3] Notice that in our model e_{it} is effort but, by changing the timing of the production function, it could even denote hours of work. Hence, broadly intended, our implications on labour effort could also suggest implications on individual labour supply.

[4] For simplicity we have kept functional forms such that the total level of stress in period t is exactly identical to βA_{it+1}. We could generalise our model to less than perfect substitutability between the productive and unproductive stress, without altering our main results.

According to (6) individuals will undertake more psychotherapy when they expect the productivity of their productive efforts to be higher and also when their inner psychological trouble is higher. Moreover, the less they discount the future - i.e. the higher is β - the more individuals value the increased income in the next period from getting psychotherapy, and the higher their current psychotherapy investment.

Plugging (6) into (5) gives

$$e_{it} = \beta A_{it+1} - \left(\frac{\tau_{it} d_{it}}{\delta \beta A_{it+1}} \right)^{\frac{1}{2}}, \tag{7}$$

which implies that in periods with higher expected productivity individuals will exercise more productive efforts, while more psychotherapy allows them to minimise the entailed extra stress. Hence, psychotherapy in this model does not affect the overall level of feeling under strain, which is due to productive pressures, but it reduces its unproductive component. The relatively cheaper psychotherapy, which is reflected by a lower parameter d_{it}, the higher the equilibrium amount of productive efforts and therefore next period equilibrium income $A_{it+1} e_{it}$.

Regarding an aggravation of other psychological individual reasons of personal trouble, as represented by higher τ_{it}, the effect will be a decrease in future income. This will encourage the individual to undertake psychotherapy, which will partially mitigate the negative consequences of future income. Quite interestingly, this does not come at any extra stress in our model's equilibrium.[5]

Finally, according to (6), controlling for stress, individuals who choose the same psychotherapy intensity despite having to overcome higher costs and social reproach, d_{it}, should necessarily enjoy higher labour productivity gains A_{it+1}. This is interesting in comparing the returns to psychotherapy between genders, because men are more socially stigmatised than women for attending psychotherapy.[6]

Therefore our model has the following implications:

1. Feeling under stress is a positive predictor of same period's psychotherapy choice.
2. Feeling under stress is a positive predictor of future period's income rise.
3. Going to psychotherapy when the overall stress level does not rise is a predictor of lower future income.
4. Men should have a higher marginal return to psychotherapy than women.

In the next sections we empirically test our results.

[5] Which is equal to βA_{it+1}.

[6] See Addis et al. (2003), and Mackenzie et al. (2014).

3 Data

The individual longitudinal observations are gathered from the "The British Household Panel Survey" (BHPS). The BHPS panel began in 1991 and followed the same representative sample of individuals over 18 years, replacing individuals who dropped off. The wave 1 panel consists of about 5,500 households and 10,300 individuals drawn from 250 areas of Great Britain. Additional samples of 1,500 households from Scotland and from Wales were added to the main sample in 1999, and in 2001 a sample of 2,000 households was added in Northern Ireland. The BHPS ended in 2008 and until then interviewed individuals annually, therefore providing an unbalanced panel data with 18 waves.

The sample used contains only the waves from 1995 onwards, for compatibility with the IV FE estimates in the Appendix. We only consider individuals who reported having difficulties with their general mental health, using the General Health Questionnaire (GHQ) Caseness score.[7] The final sample used for all the estimates is composed of individuals between 18 and 60 years old who are part of the labour force. This means that retired, long term sick, disabled, and individuals who did not offer information about their labour force status are excluded from the sample. Women on maternity leave are kept in the sample as long as they provide information about their labour force status. The estimation sample finally includes 2,906 men and 5,028 women, with respectively 5,793 men-year and 11,520 women-year observations.

The BHPS offers detailed employment and demographic information. In each of its 18 waves several questions are asked about health and welfare services used, including a question about seeking psychological help: "Which (of the listed health and welfare) services have you used?" Psychotherapists and social workers are two of the possible answers. A dummy variable is set to 1 if the respondent reports having consulted a psychotherapist or a social worker in the survey year or in any past survey, and 0 otherwise. Consistently with the analytical model, accessing the services of a psychotherapist does not only have a contemporaneous effect on income but also has a permanent effect. In other words, psychotherapy affects all future labour income, rather than only contemporaneous income, which is equivalent to assuming no depreciation for mental health investment. This approach is consistent with the classic hypothesis by Grossman (1972) of health being a durable capital good. Therefore, if psychological health deteriorates with time, psychotherapy helps restore it not just for the current period but also for the future, and has long-lasting effects.

The hypothesis regarding the long-term effects of psychotherapy is also consistent with recent findings in the medical literature, which unanimously agrees on the topic. Leuzinger-Bohleber et al. (2003) analyse the mental health status of patients 6.5 years after the end of their psychotherapy treatment and find that between 70% and 80% of them achieved good and stable psychological changes. Moreover, they find a substantial decrease in the number of days of sick leave for several years following the end of treatment. Sandell et al. (2000) observe

[7] The next section presents a detailed description and analysis of the selection mechanism.

patients for three years after their psychotherapy treatments ended and find evidence of long-lasting mental health improvement. Knekt et al. (2011) follow individuals for five years following the end of their psychotherapy treatment and find long-lasting effects in terms of mental health and work ability, albeit short-term therapy provides a somewhat weaker effect than long-term psychoanalysis. Lindgren et al. (2010) focus on the effects of treatment on young adults aged 18-25, and argue for long-term effectiveness of psychotherapy.

3.1 Descriptive Statistics

Table 1 shows the frequency of consulting a psychotherapist or a social worker by year and sex. We include social workers as they could offer psychological support and are often trained psychotherapists[8]. Overall, 7.4% of the sample consults a psychotherapist every year, 5.5% of men, and 8.3% of women. Data about consulting a psychotherapist are consistent over the years for both men and women. In each of the 14 waves (from 1995 to 2008) women consult psychotherapists more than men: the range is between 4.3% and 7.6% for men, and between 6.2% and 12.0% for women.

Although these percentages seem small, they still represent a substantial part of the population due to the strong non-persistent nature of psychotherapist consultation. The overall percentage increases to 20.25% when considering the number of individuals in the sample who at some point or another sought help of a psychotherapist. Also in this case women tend to consult psychotherapists more than men: overall 22.97% of women went into therapy at some point compared to 14.78% of men.

Table 2 shows the frequencies of individual characteristics. Overall, there is not much difference in individual characteristics between respondents who consulted a psychotherapist and respondents who did not, both for men and women. Some characteristics are noticeably different: as expected, respondents who are in psychotherapy tend to show lower mental health. In particular, they tend to have an higher GHQ score and more psychological problems. Secondly, they are also more often unemployed and work less hours per week. Finally, individuals in professional roles and working in the private sector seem to be less likely to consult a psychotherapist. However, all these differences are not significant when considering the difference of the differences between men and women. Only part-time work and number of children show a significant gender difference. Since all estimates are performed using FE, discrepancies in psychotherapy consultation according to individual characteristics do not interfere with the results.

In the dataset used for estimation only individuals who report having low mental health are included. In each wave, the BHPS asks 12 questions that together compose the GHQ. Questions vary from feeling under strain, feeling depressed, having difficulties sleeping, etc. Questions can be answered on a

[8] For sake of brevity we will only refer to the variable as psychotherapy from now on.

scale 1 (better than usual), to 4 (much worse than usual). The number of mental problems is calculated adding 1 unit for each response higher than 2 on the GHQ questions, and therefore varies between 0 and 12. For each estimate we include all individuals who experience more than 4 types of mental problems. The choice is motivated by wanting to focus on the minority of the population who suffers from mental health problems, which is necessary in order to be consistent with the theoretical model. Table 3 reports the differences in personal characteristics between the whole sample and the subsample of individuals with low levels of mental health by gender. Individuals with poor mental health do not seem to have systematically different personal characteristics compared to individuals who do not report having low mental health. When considering the difference of the differences between men and women we find that marriage, education, income, being a professional, and size of firm are significantly different.

Considering only respondents with low mental health reduces the sample from 20,422 to 7,934 individuals, with the number of men decreasing from 9,317 to 2,906, and the number of women decreasing from 11,105 to 5,028. A possible concern is that a different report rate between men and women can skew the sample and affect the estimates due to attrition bias. However, characteristics are overall comparable and there is not any evident discrepancy in gender specific trends since the small differences between the two groups are common to both men and women. Moreover, it should be noticed that all main results are robust to the inclusion of all individuals irrespectively of their mental health state, both in terms of the type of effect and of differences between genders (as shown in Table 7, where the FE estimates presented in Table 4 are repeated for all individuals, irrespective of their mental health status).

Finally, Figure 1 presents a histogram of the distribution of the number of reported mental health problems by gender. Also in this case, there is no strong difference in the patterns between men and women. Men tend to report having marginally less mental health problems than women: in 57% of observations men report having no mental health problems, compared to 50% of women. Therefore, even though there are some differences between the psychological health of the two genders, these are not substantial, and about half of men and women experience at least one mental health problem. For all the other categories, which vary from 1 to 12, the distribution is similar and follows the same pattern. This means that, when considering only individuals with low mental health, the sample is still comparable to the original one.

4 The Effect of Psychotherapy on Income

For the first time to our knowledge, returns to consulting a psychotherapist are analysed empirically. Personal characteristics are key in this investigation, therefore, exploiting the panel nature of the BHPS, we focus on FE estimates, which are presented in Table 4.

The dependent variable is the logarithm of hourly income in constant 2010

GBP, built as the yearly income divided by number of hours worked per week, which have been previously multiplied by the average weeks worked in the UK (50.2). Individuals who do not work are kept in the sample and the logarithm of their hourly income is set to 0. It should be noticed that Table 7 shows that results are robust to eliminating unemployed individuals from the sample.

Moreover, in each regression we add a number of controls to ensure the robustness of our results. In particular, in each estimate we add controls for private life characteristics that can change with time by introducing age dummies, being a student, a dummy variable for being married, which includes civil partnership, the number of own children living in the same household, and dummies for the age range of the children (0-2, 3-4). We control for working part time or full time, and whether the respondent is a professional worker. We also control for the work environment by adding a dummy variable for the size of the firm the individual work for (more than 100 workers) and the firm being a for-profit organization. Each of the work related variables is set to 0 if the person is unemployed, however the FE estimates and the IV FE estimates (in the Appendix) are not sensitive to the coding of the variables: if these variables are set to the sample mean for unemployed individuals, then the magnitude and significance of the psychotherapy variable do not change.

Finally, we want to make sure that by estimating the returns to consulting a psychotherapist we are not looking at the "ability to pay" for a psychotherapist, and therefore introduce a control for having consulted a private/voluntary psychotherapist, a National Health Service (NHS) psychotherapist, or both in the previous year. Moreover, we introduce a control for having paid for the psychotherapy service, having received it for free, or a mix of the two in the previous year.

Since we are using FE it would be redundant to add fixed characteristics such as education, ethnicity, and religion. Moreover, since a very small proportion of individuals change region, adding regional dummies is not significant.

The FE regression in Table 4 presents estimates for men (columns 1 and 2), and women (3 and 4). First, the analysis focuses on all male and female individuals only with the work status as control (columns 1 and 3) and then adds all the other controls (columns 2 and 4). Standard errors are clustered at the individual level.

For both men and women we obtain positive coefficients for psychotherapy in each case. This means that having consulted a psychotherapist results in an increase of income for individuals who report low psychological health. For men the increase in income varies from .123 with only work status as control (column 1) to .124 with the full set of controls (column 2). Both are precisely estimated. For women the same estimates range from .101 with partial controls to .081 with full set of controls (respectively columns 3 and 4), also in this case both are precisely estimated. Therefore, FE estimates confirm the theoretical results and show that psychotherapy has a strong positive effect on real hourly wage (productivity) and total labour income. At the same time it highlights that men benefit more than women from it. According to the FE estimates, the effect of psychotherapy on income for men is between 18% and 36% stronger

than for women.

Table 4 also shows that working part-time and working full-time has a strong effect on the logarithm of hourly income, with working full-time having a stronger effect. The number of own children is negatively associated with income for women but not for men, while having children aged 0-2 is positively associated with income for both genders, albeit this is not precisely estimated for men. Being married, being a professional worker, and working for a big firm are positive predictors of income for both genders. Having paid a psychotherapist and having consulted a private psychotherapist in the previous year do not have a consistent effect between each other nor between the genders.

While our estimates of the effects of psychotherapy on personal income are unique, they are consistent with the results of studies about health changes and productivity or labour supply. There is a rich literature showing that a decrease in health causes a reduction in income and productivity, while an improvement in health causes higher levels of productivity. Using panel data, Cai (2010) finds that a 1 unit increase in health causes a substantial increase in labour participation and that the effect is much stronger for men than for women (respectively 41% and 23%). More specifically, factors influencing health have been proven to impact productivity. Exogenous changes in pollution affect health and in turn income and labour supply: Carson et al. (2011) conclude that an increase in pollution in Bangladesh caused a decrease in health that translated into an 8% decrease in labour supply, while Graff, Zivin and Neidell (2012) show that a 10 points decrease in ozone concentration causes a 5.5% decrease in productivity. Finally, Clay et al. (2010) find that an increase in lead poisoning decreases productivity by 9-16%.

Also medical intervention and the use of medication affect income. For example, according to Burton et al. (2001) the lack of use of allergy medication reduces productivity by 10% in allergic subjects, while Resch et al.(2011) prove that AIDS reduces productivity by 20% without medication, while with the use of appropriate treatment productivity decreases only by 4%. Finally, according to Kimball et al. (2012), psoriasis treatment improves individuals' productivity by 13%.

Consistent with our estimation strategy, it has been found that health has a persistent effect on income. In this spirit and from a long-term perspective, Smith (2007) finds that a better childhood health increases future income by 24.8%, while Schultz (2002) shows that improved childhood health care, which is used to instrument a one-centimeter increase in height, causes an 8% to 10% percent increase in wages in Ghana and Brazil for both men and women. With regards to mental health, Ettner et al. (1997) find that men and women with mental disorders earn respectively 10% and 29% less than individuals with no mental disorders. Our estimates are therefore consistent with what has been found with regards to other aspects of health and income by recent literature.

4.1 Mechanism

Table 2 highlights that currently consulting a psychotherapist tends to be associated with worse mental health. This is consistent with our theoretical model, as individuals who have worse mental health, or who are aware of having worse mental health, should be more likely to seek help.

In Table 5 we explore the connection between psychological health and psychotherapy in more detail. Using FE estimates, we show that having previously consulted a psychotherapist is associated with better mental health in the present. In this case we consider only having consulted a psychotherapist at some point in the past, without taking into account the current effect. In columns 1 and 2 we show the effect on the GHQ Caseness score (which ranges between 12 and 48, where 12 means that there are no reported issues) for men and women. For all estimates we add the same set of controls as in Table 4. Both genders seem to benefit from psychotherapy in terms of mental health, with women receiving a stronger positive effect (-1.197) than men (-.468), for whom the psychotherapy coefficient is not precisely estimated. This suggests that psychotherapy increases income as it improves mental health. Moreover, it indicates the higher returns on income for men do not derive from a stronger mental health improvement for men.

In column 3 and 4 we show the effect on the amount of mental problems reported again by gender. This second measure is calculated by adding 1 unit for each response higher than 2 on the GHQ questions, and therefore varies between 0 and 12. Also in this case we obtain precisely estimated positive effects of mental health for both genders, with coefficients equal to -.503 for men and -.780 for women. Consistently with columns 1 and 2, the effect is stronger for women than for men[9]. These estimates suggest that at least part of the reason why psychotherapy causes higher productivity and income should be an improvement in mental health.

5 Robustness

We perform several robustness tests to show that the FE estimates are indeed showing a causal effect of psychotherapy on income. First, we check whether there is any variable that predicts a switch to psychotherapy. Second, we run a series of alternative estimates. In the Appendix, we perform IV FE estimation, showing also in this case a series of estimates from alternative specifications. All performed tests point to the fact that the positive effect of psychotherapy on income is robust and confirm the strong gender differences.

[9] The Oaxaca-Blinder decomposition (described in Section 6) shows that consulting a psychotherapy accounts for 7.4% of the absolute sum of the explained and 3.0% of the absolute sum of the unexplained parts of the gender gaps for the GQH. The same statistics are 14.9% and 3.0% of the gender gap for the number of mental health problems.

5.1 Predictors of Psychotherapy and Alternative Estimates

If the switch to psychotherapy could be predicted by other variables, then the validity of the FE estimates would be questionable, as there would be an omitted variables bias. To make sure this is not the case we show several FE estimates of possible predictors of psychotherapy in Table 6.

The dependent variable is having consulted a psychotherapist in the current period, while in each regression the explanatory variable refers to the previous period. Columns 1 and 3 show the coefficients in each case for men and women, while columns 2 and 4 present the standard errors. The explanatory variables are in turn: having been divorced, having experienced poor health, having been employed, number of hours worked per week, hourly income, yearly income, having moved house. All these variables could potentially cause a switch to psychotherapy. In each regression we add the same controls as in Table 4, excluding the conflicting ones in each case.

For each estimated coefficient of the explanatory variable is very small in magnitude and not precisely estimated, which suggests that the switch to psychotherapy is as good as random, thus confirming the validity of the FE estimates presented in Table 4.

In Table 7 we present a series of alternative estimates to the fixed effect model presented in Table 4. Columns 1 and 2 show results for men with employment status controls and with the full set of controls respectively. Columns 3 and 4 repeat this for women. First, we consider only employed individuals to make sure we are not capturing only an effect that depends on transition to employment. Second, we remove the restriction on mental health, including all individuals irrespective of their psychological status. In this way we show that FE results do not depend on special characteristics of the restricted sub-sample. This is a particularly important check to make sure the results do not suffer from a strong attrition bias. It can be noticed that in this case the estimates are very close to the original ones, with a slight increase in the magnitude of the coefficient for women (from .080 to .100) and a slight increase in the magnitude of the coefficient for men (from .124 to .125). Third, we consider the logarithm of yearly income expressed in thousands of constant 2010 GBP as dependent variable, instead of the logarithm of hourly income. This control is performed to check that the higher hourly income is not caused by a reduction in the number of hours worked. It shows that the effect on yearly income is stronger compared to the effect on hourly income, especially for men. This suggests that for men there might be a significant increment in the number of hours worked per week. In order to explore this, we estimate directly the effect of consulting a psychotherapist on hours worked[10], and find that consulting a psychotherapist is associated with an extra 2.120 hours worked per week for men, which is precisely estimated, while for women it is associated with a non-statistically significant .195 decrease in hours worked per week.

In each case we obtain precisely estimated coefficients for both men and

[10] We do not report these estimates for sake of brevity, but they are available upon request from the authors.

women, both with and without the full set of controls. The magnitude of the coefficients is also comparable and relatively stable. Psychotherapy coefficients vary between .124 and .183 for men and between .080 and .163 for women. Moreover, in each specification the gender pattern is confirmed as men receive higher returns than women from psychotherapy in terms of income.

6 Gender Earnings Gap

It is evident from the FE estimates (Table 4) that when it comes to calculating the effects of consulting a psychotherapist on income men benefit much more than women. Even if women consult a psychotherapist more often, men seem to receive consistently higher returns from psychotherapy. In order to investigate the effects of consulting a psychotherapist on the gender gap we apply the Oaxaca-Blinder (Blinder 1973, Oaxaca 1973) decomposition to the FE estimates reported in Table 4[11]:

$$\overline{Y}^m - \overline{Y}^f = \widehat{\beta}^m(\overline{X}^m - \overline{X}^f) + (\overline{\beta}^m - \overline{\beta}^f)\overline{X}^f \tag{8}$$

Where $\overline{Y}^m$ and $\overline{Y}^f$ represent respectively average male and female income, $\widehat{\beta}^m$ and $\overline{\beta}^f$ are row of vectors of FE estimates for men and women. Finally, $\overline{X}^m$ and $\overline{X}^f$ represent column vectors of sample means for men and women. The first term represents the endowment effect and is the part of the gender gap attributable to differences in characteristics. The second term is the coefficient effect: the part of the gap attributable to the difference in the return of characteristics, which is also associated with discrimination.

Recent literature has provided several methods of decomposition, which can be used to analyse the gender wage gap. However, in this specific case the Blinder-Oaxaca decomposition seems to be the most appropriate. Using a distributional method, such as the residual imputation procedure developed by Juhn, Murphy, and Pierce (1991, 1993) would allow us to analyse the wage gap both between and within groups, but would not be applicable to FE and would not be divided by different components; this means that we would be unable to calculate the effect of consulting a psychotherapist on the gender wage gap. Unfortunately, also a distributional method based on conditional quantiles, as the ones proposed by Machado and Mata (2005), and Chernozhukov et al. (2013), would not allow for a detailed decomposition (Fortin et al. 2011). The difficulty of extending an aggregate decomposition to a detailed decomposition is also the reason why using a reweighed procedure in the spirit of DiNardo et al. (1996) or Card et al. (2013) is not appropriate in this case.

Using the results from the FE estimates, Table 8 reports selected endowment and coefficients effects. In the specification with only employment status controls, the overall difference in the logarithm of hourly earnings between males and females is .483, while it is .532 in the estimates with all the controls. The

[11] The decomposition is then repeated for IV FE in the Appendix.

FE estimates imply that 7.0% in the first specification and 7.5% in the second specification of this difference is attributable to coefficients effects, which are the unexplained part of the wage gap.

Our results regarding the magnitude of the unexplained part of the wage gap should not be surprising. In fact, according to gender wage gap literature, over the past 50 years differences in skills in developed countries have become more and more negligible. On the contrary, discrimination (Blau and Ferber 1987, Blau and Kahn 1994, 1997, Goldin and Rouse 2000), differences in altruism (Andreoni and Vesterlund 2001), and discrepancies in the ability or willingness to introduce themselves in competitive environments (Gneezy et al. 2003, Gneezy and Rustichini 2004, Niederle and Vesterlund 2007), amongst other factors, reduced the wage gender gap of mature economies far more slowly. In particular, with regards to the UK, Wright and Ermish (1991) analysed differences in wage offers to married men and women in 1980. They found that about 17% of the gender gap depends on differences in characteristics, while 48.8% on discrimination. In fact, even after the path breaking moment represented by the anti-discrimination laws in the early 70s (Greenhalgh 1980, Wright and Ermish 1991), the gender gap estimates have been rather consistent in identifying, for the UK, a relatively small proportion of the gender gap dependent on differences in characteristics. This conclusion is supported by Makepeace et al. (1999), and Beblo et. al (2003).

Table 8 also shows the effect that psychotherapy has on the gender wage gap. Using FE estimates, psychotherapy accounts for -1.2% in the first and in the second specification of the overall endowment effect, and respectively for 2.7% and for 2.4% of the overall coefficient effect.

Results in Table 8 show that even controlling for a full set of personal characteristics it is possible to observe two facts. First, a lot more women consult psychotherapists compared to men (negative endowment effect). Second, men who consult a psychotherapist receive a bigger economic benefit than women (positive coefficient effect). Why do we find such robust differences? There are two plausible explanations that we derive from previous psychology research. First, men are less inclined to consult doctors in general and psychotherapists in particular. There are several theories as to why this is the case, the most widely accepted being that the social norm for men is not to seek help, and that help seeking is considered equivalent to a loss of masculinity. Social stigma and personal stigma are very strong for both sexes, but "boys don't cry". As a result accepting or seeking the help of a mental health specialist can be very difficult for men and decrease the participation rate in psychotherapy (Addis et al. 2003, and Mackenzie et al. 2014).

With regards to the differences in returns, it is common knowledge that women suffer gender discrimination in the workplace. According to psychology literature women exposed to gender discrimination are likely to develop mental health problems, as for example stress, depression, and anxiety (Landrine et al. 1995, Elwér et al. 2013). In this case the help of a psychotherapist can reduce mental distress, but it is very unlikely that the woman will gain much in terms of income, since the very source of the distress is discrimination in the

workplace, which is not likely to improve as a result of psychotherapy, unless the woman changes workplace.

7 Conclusions

Recently, economists started investigating the connection between income and mental health, finding that wealth and unemployment have a strong impact on health in general (Bockerman and Ilkmakunnas 2009, Clark and Oswald 1994, Schmitz 2010), and on psychological health in particular (Gathergood 2012, and 2013). However, the effect of consulting a psychotherapist on productivity and personal income has never been investigated before. This is surprising since psychotherapy can have a strong impact on productivity. Psychotherapy has been proven to mitigate the negative effects of mental health problems, which in turn are imposing a big burden on British economy and society, since they are the first reason for missing days of work in the country.

For the first time we present a theoretical and empirical analysis of the effect of consulting a psychotherapist on personal income. This paper presents a theoretical model that analyses the impact of a decrease in mental health on productivity, and how this effect is reduced by seeking the help of a psychotherapist, which in turn increases productivity and income. At the same time, the model takes into account the various costs associated with consulting a psychotherapist, both monetary, for example the actual payment to a private psychotherapist, or the cost of commuting and childcare costs; as well as the cost associated with facing a social norm that stigmatizes help seeking. The latter is assumed to be stronger for men. The result is that a decrease in the costs associated with consulting a psychotherapist increases the likelihood of help seeking and has a positive effect on productivity and income.

We test the theoretical result empirically using a fixed effect model: we find that consulting a psychotherapist has a positive impact on income, and that the impact is bigger for men than for women. In particular men can expect to gain between 12.3% and 12.4% from psychotherapy, while for women the expected gain varies between 10.1% and 8.1%. IV FE estimates (in the Appendix) confirm both the positive effect of psychotherapy and the existence of differences between genders. Moreover, we perform a series of alternative specifications and find that in each specification men consult psychotherapists less often and at the same time gain more than women from psychotherapy. In percentage terms we find that women benefit between 18% and 36% less than men.

In order to better understand the differences in returns and their impact on the wage gender gap we perform the Oaxaca-Blinder gender wage gap decomposition and show that consulting a psychotherapist accounts for 2.4% of the part of the gender gap which is left unexplained and is associated with discrimination (the coefficient effect).

Current research is not able to analyse the mechanism behind the differences in the returns in more depth. Our conjecture, based on the model, and consistent

with established literature in psychology, is that men consult psychotherapists less because of stronger stigma, while women might receive lower returns because of workplace discrimination. However, future research should further develop the analysis of these mechanisms from an economic point of view.

References

Addis, M. E., and J.R. Mahalik, (2003), "Men, Masculinity, and the Contexts of Help Seeking." *American Psychologist,* 58(1), 5.

Andreoni, J., and L. Vesterlund, (2001), "Which is the Fair Sex? Gender Differences in Altruism," *The Quarterly Journal of Economics,* 116(1): 293-312.

Angrist, J.D., K. Graddy, and G. Imbens, (2000), "The Interpretation of Instrumental Variables Estimators in Simultaneous Equations Models with an Application to the Demand for Fish", *Review of Economic Studies,* 67: 499-527.

Angrist, J. D., and J.S. Pischke, 2008, Mostly Harmless Econometrics: An Empiricist's Companion. Princeton University Press.

Beblo, M., D. Beninger, F. Laisney, and A. Heinze (2003), "Measuring Selectivity Corrected Gender Wage Gaps in the EU, Report commissioned by the European Commission," DG Employment and Social Affairs.

Blau, F. D., and M.A. Ferber, (1987), "Discrimination: Empirical Evidence from the United States," *The American Economic Review,* 77(2):316-320

Blau, F. D., and L.M. Kahn, (1994), "Rising Wage Inequality and the US Gender Gap," *The American Economic Review,* 84(2): 23-28.

Blau, F. D., and L.M. Kahn, (1997), "Swimming Upstream: Trends in the Gender Wage Differential in the 1980s," *Journal of Labor Economics*, 1-42.

Blinder, A.S. (1973), "Wage Discrimination: Reduced form and Structural Estimates," *Journal of Human Resources,* 18: 436-455.

Bockerman P, and P. Ilkmakunnas, (2009), "Unemployment and self-assessed health: evidence from panel data," *Health Economics,*18: 161–179.

Burton, W. N., Conti, D. J., Chen, C. Y., Schultz, A. B., and Edington, D. W., (2001), "The impact of allergies and allergy treatment on worker productivity," *Journal of Occupational and Environmental Medicine*, 43(1), 64-71.

Cai, L. (2010), "The relationship between health and labour force participation: Evidence from a panel data simultaneous equation model," *Labour Economics*, 17(1), 77-90.

Card, D., A. R. Cardoso, and P. Kline, (2013), "Bargaining and the Gender Wage Gap: A Direct Assessment," IZA Discussion Paper No. 7592.

Carson, R. T., P. Koundouri, and C. Nauges (2011), "Arsenic Mitigation in Bangladesh: A Household Labor Market Approach." *American Journal of Agricultural Economics,* 93 (2): 407-14.

CCG Inequality Indicators, Unplanned Hospitalisation for Chronic Ambulatory Care Sensitive Conditions 2015/16, University of York, http://www.ccg-inequalities.co.uk/, accessed on 22/08/2016.

Chernozhukov, V., I. Fernandez-Val, and B. Melly, (2013), "Inference on Counterfactual Distributions," Econometrica, 81(6), 2205-2268.

Clark A, and A. Oswald, (1994), "Unhappiness and Unemployment," *The Economic Journal,* 104: 648–659.

Clark A., (2003), "Unemployment as a Social Norm: Psychological Evidence from Panel Data," *Journal of Labor Economics*, 21: 323–351.

Clay, K., W. Troesken, and M. R. Haines, (2010), "Lead, Mortality, and Productivity." National Bureau of Economic Research Working Paper 16480.

Cuijpers P., Sijbrandij M., Koole S.L., Andersson G., Beekman A.T., and C.F. Reynolds (2013), "The Efficacy of Psychotherapy and Pharmacotherapy in Treating Depressive and Anxiety Disorders: a Meta-Analysis of Direct Comparisons," *World Psychiatry,*12:137–48.

DiNardo, J., N. M. Fortin, and T. Lemieux, (1996), "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica,* 64: 1001-1044.

Elwér, S., Harryson, L., Bolin, M., and A. Hammarström, (2013). "Patterns of Gender Equality at Workplaces and Psychological Distress". *PloS One*, 8(1), e53246.

Ettner, S. L., Frank, R. G., and Kessler, R., (1997), "The impact of psychiatric disorders on labor market outcomes," *Industrial and Labor Relations Review*, 51(1), 64-81.

Fortin, N., T. Lemieux and S. Firpo, 2011, "Decomposition Methods," in O. Ashenfelter and D. Card (eds.) Handbook of Labor Economics, Vol. 4A, Amsterdam: North-Holland, 1-102.

Gathergood, J. (2012), "Debt and Depression: Causal Links and Social Norm Effects," *The Economic Journal,* 122(563), 1094-1114.

Gathergood, J. (2013), "An Instrumental Variable Approach to Unemployment, Psychological Health and Social Norm Effects," *Health Economics*, 22: 643–654.

Gneezy, U., M. Niederle, and A. Rustichini, (2003), "Performance in Competitive Environments: Gender Differences," *The Quarterly Journal of Economics,* 118(3): 1049-1074.

Gneezy, U., and A. Rustichini, (2004), "Gender and Competition at a Young Age," *The American Economic Review,* 94(2): 377-381.

Goldin, C., and C. Rouse, (2000), "Orchestrating Impartiality: The Impact of "Blind" Auditions on Female Musicians," *The American Economic Review,* 90(4):715-741.

Graff Zivin, Joshua, and Matthew Neidell, (2012), "The Impact of Pollution on Worker Productivity," *American Economic Review,* 102 (7): 3652

Greenhalgh, C. A., (1980), "Male-female Wage Differentials in Great Britain: Is Marriage an Equal Opportunity?," *Economic Journal,* 90:751-75.

Grossman, M., (1972), "On the Concept of Health Capital and the Demand for Health," Journal of Political Economy, 80(2), pp.223-255.

Health and Social Care Information Centre, (2016) "Mental Health and Learning Disabilities Statistics Monthly Report"

Juhn, C., K. M. Murphy, and B. Pierce, 1991, "Accounting for the Slow-down in Black-White Wage Convergence, in Workers and Their Wages: Changing Patterns in the United States," ed. by M. H. Kosters. American Enterprise Institute, Washington.

Juhn, C., K. M. Murphy, and B. Pierce, (1993), "Wage Inequality and the Rise in Returns to Skill," *Journal of Political Economy,* 101: 410-442.

Kimball, A. B., Andrew, P. Y., Signorovitch, J., Xie, J., Tsaneva, M., Gupta, S. R., and Mulani, P. M., (2012), "The effects of adalimumab treatment and psoriasis severity on self-reported work productivity and activity impairment for

patients with moderate to severe psoriasis," *Journal of the American Academy of Dermatology*, 66(2), e67-e76.

Knekt, P., Lindfors, O., Laaksonen, M. A., Renlund, C., Haaramo, P., Härkänen, T., ... and Helsinki Psychotherapy Study Group. (2011), "Quasi-experimental Study on the Effectiveness of Psychoanalysis, long-term and short-term Psychotherapy on Psychiatric symptoms, Work Ability and Functional Capacity During a 5-year follow-up," *Journal of Affective Disorders*, 132(1), 37-47.

Kugler, A., and R.M. Sauer, (2005), "Doctors without Borders? Relicensing Requirements and Negative Selection in the Market for Physicians," *Journal of Labor Economics*, 23: 437-465.

Lam, R.W., Parikh, S.V., Ramasubbu, R., Michalak, E.E., Tam, E.M., Axler, A., Yatham, L.N., Kennedy, S.H. and C.V. Manjunath., (2013), "Effects of Combined Pharmacotherapy and Psychotherapy for Improving Work Functioning in Major Depressive Disorder," *The British Journal of Psychiatry*, 203(5): 358-365.

Landrine H, Klonoff EA, Gibbs J, Manning V, and M. Lund, (1995), "Physical and psychiatric correlates of gender discrimination," *Psychology of Women Quarterly,* 1;19(4):473-92.

Lerner D, and R.M. Henke, (2008), "What Does Research Tell Us About Depression, Job Performance, and Work Productivity?" *Journal of Occupational and Environmental Medicine*, 50(4):401-10.

Leuzinger-Bohleber, M., Stuhr, U., Rüger, B., and Beutel, M. (2003), "How to Study the 'Quality of Psychoanalytic Treatments' and Their Long-Term Effects on Patients' Well-being: A Representative, Multi-Perspective Follow-up study," *The International Journal of Psychoanalysis*, 84(2), 263-290.

Lindgren, A., Werbart, A., and Philips, B. (2010), "Long-Term Outcome and Post-Treatment Effects of Psychoanalytic Psychotherapy with Young Adults," Psychology and Psychotherapy: Theory, Research and Practice, 83(1), 27-43.

Machado, J. F. and J. Mata, (2005), "Counterfactual Decomposition of Changes in Wage Distributions Using Quantile Regression," *Journal of Applied Econometrics,* 20: 445-465.

Mackenzie, C. S., Erickson, J., Deane, F. P., and M. Wright, (2014). "Changes in Attitudes Toward Seeking Mental Health Services: A 40-Year Cross-Temporal Meta-Analysis." *Clinical Psychology Review*, 34(2), 99-106.

Makepeace, G., P. Paci, H. Joshi, and P. Dolton, (1999) "How Unequally has Equal Pay Progressed Since the 1970s? A study of two British Cohorts," *Journal of Human Resources,* 534-556.

McLean C.P., Asnaani A., Litz B.T., and S.G. Hofmann, (2011), "Gender Differences in Anxiety Disorders: Prevalence, Course of Illness, Comorbidity and Burden of Illness," *Journal of Psychiatric Research,* 45(8):1027-35.

Mental Health Foundation Website, accessed on 31st of August 2016.
http://www.mentalhealth.org.uk/help-information/mental-health-a-z/S/stress/

Mental Health Foundation Website, accessed on 17th of August 2016.
https://www.mentalhealth.org.uk/our-work/mental-health-workplace

Niederle, M., and L. Vesterlund, (2007), "Do Women Shy Away from Competition? Do men compete too much?" *The Quarterly Journal of Economics,* 122(3):1067-1101.

Oaxaca, R., (1973), "Male Female Wage Differentials in Urban Labor Markets," *International Economic Review,* 14: 693-709.

Psychological Therapies, Annual Report on the use of IAPT services, 2014, Community and Mental Health team, Health and Social Care Information Centre.

Resch, S., Korenromp, E., Stover, J., Blakley, M., Krubiner, C., Thorien, K., and Atun, R. (2011), "Economic returns to investment in AIDS treatment in low and middle income countries," *PloS one*, 6(10).

Sandell, R., Blomberg, J., Lazar, A., Carlsson, J., Broberg, J., and Schubert, J. (2000), "Varieties of Long-term Outcome among Patients in Psychoanalysis and Long-term Psychotherapy: A Review of Findings in the Stockholm Outcome of Psychoanalysis and Psychotherapy Project (STOPPP)". The International journal of psycho-analysis, 81(5), 921.

Schmitz H. (2010), "Why are the Unemployed in Worse Health? The Causal Effect of Unemployment on Health," *Labour Economics,* 18: 71–78

Schultz, T. P. (2002), "Wage Gains Associated with Height as a Form of Health Human Capital," *American Economic Review*, 92(2), 349-353.

Smith, J. P. (2007), "The Impact of Socioeconomic Status on Health over the Life-Course," *Journal of Human Resources*, 42(4): 739-64.

Stock, James H., Jonathan H. Wright, and Motohiro Yogo, (2002), "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments,"*Journal of Business and Economic Statistics,* 20, 518–529.

Taylor, Marcia Freed (ed). with John Brice, Nick Buck and Elaine Prentice-Lane (2010) British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices. Colchester: University of Essex.

The Five Year Forward View for Mental Health (2016), a report by independent Mental Health Taskforce to the NHS in England.

World Health Organization, International Consortium of Psychiatric Epidemiology. 2000. Crossnational comparisons of mental disorders. Bulletin of the World Health Organization, 78: 413-426.

Wright, R. E., and J.F. Ermisch, (1991), "Gender Discrimination in the British Labour Market: a Reassessment," *The Economic Journal,* 101(406):508-522.

Table 1: Consulting a Psychotherapist by Gender and Year

Year	Full Sample	Men	Women	N.
1995	.066	.056	.070	885
1996	.055	.043	.062	937
1997	.063	.059	.065	1,060
1998	.077	.057	.088	1,007
1999	.095	.076	.105	1,287
2000	.064	.051	.070	1,386
2001	.074	.049	.086	1,656
2002	.080	.063	.089	1,382
2003	.070	.052	.080	1,353
2004	.098	.058	.120	1,268
2005	.075	.060	.082	1,305
2006	.073	.059	.080	1,189
2007	.071	.047	.083	1,189
2008	.066	.045	.077	1,147
Whole Sample	.074	.055	.083	17,091
N.	17,091	5,697	11,394	

Note: the figures are row proportions. N is the number of male and female respondents aged 18-60, who suffer from mental health problems.

Table 2: Summary Statistics for Individuals Reporting Low Psychological Health in BHPS

	Men				Women				
	All	Cons Psych.	Not Cons Psych	Difference (2)-(3)	All	Cons Psych.	Not Cons Psych.	Difference (6)-(7)	Diff-in-diff (8)-(4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Demographics									
Age	34.78	34.76	34.78	-.019 (.763)	35.07	34.99	35.08	-.099 (.506)	-.080 (.927)
Married	.437	.411	.439	-.028 (.031)	.440	.385	.448	-.036 (.037)	.090 (.012)
N. of Children	.591	.671	.583	.088 (.061)	.709	.973	.669	.304***(.088)	.216** (.074)
Child. 0-2 years	.078	.080	.078	.002 (.015)	.095	.124	.090	.033** (.011)	.031 (.019)
Ethnic Minority	.034	.023	.035	-.012 (.012)	.040	.039	.040	-.001 (.008)	.011 (.015)
GHQ Score	31.96	33.76	31.40	2.35***(.235)	32.31	34.55	31.97	2.58***(.153)	.226 (.283)
N. Psy. Problems	7.30	8.23	7.21	1.03***(.122)	7.67	8.52	7.54	.986***(.079)	-.040 (.146)
Education									
GCSE	.206	.195	.207	-.012 (.028)	.269	.289	.266	.023 (.020)	.035 (.035)
A-Levels	.199	.221	.196	.025 (.027)	.196	.170	.199	-.029 (.018)	-.054 (.032)
Degree	.529	.498	.532	-.034 (.034)	.453	.436	.456	-.019 (.022)	.014 (.041)
Student	.105	.104	.106	-.002 (.019)	.123	.081	.129	-.048***(.013)	-.046 (.023)
Employment									
Unemployed	.297	.430	.284	.146***(.028)	.403	.533	.383	.150***(.019)	.003 (.034)
Part Time	.027	.031	.027	.004 (.009)	.189	.147	.195	-.048***(.015)	-.053* (.023)
Full Time	.676	.539	.690	-.151***(.029)	.408	.320	.422	-.101***(.019)	.049 (.035)
Hours Worked Per	28.12	22.60	28.67	-6.07***(1.12)	18.98	14.85	19.62	-4.77***(.647)	1.29 (1.25)
Hourly Income	13.25	13.25	13.25	-.004 (.642)	10.39	10.20	10.41	-.215 (.408)	-.211 (.750)
Private Sector	.526	.366	.542	-.176***(.031)	.332	.226	.349	-.123***(.018)	.053 (.035)
Professional	.300	.226	.349	-.083** (.028)	.237	.183	.245	-.062***(.017)	.020 (.032)
Firm size >100	.322	.293	.325	-.032 (.028)	.228	.184	.235	-.051** (.016)	-.019 (.031)
PT									
Private	.008	.091	-	-	.006	.064	-	-	-
Paid a Fee	.006	.066	-	-	.008	.057	-	-	-
N	2,906	263	2,643		5,028	676	4,352		

Note: the figures are individual proportions (or averages) over time, averaged over the number of individuals. PT is the abbreviation for psychotherapy. N is the number of individuals. The sample includes all male and female respondents aged 18-60 who suffer from mental health problems, between the years 1995 and 2008. Hourly income is expressed in constant 2010 GBP. Earnings of the unemployed are included and set to zero.

Table 3: Summary Statistics for Individuals by Psychological Health in BHPS

	Men				Women				
	All	L Ment Health	H Ment Health	Difference (2)-(3)	All	L Ment Health	H Ment Health	Difference (7)-(6)	Diff-in-Diff (8)-(4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Demographics									
Age	33.33	34.70	32.70	2.00***(.287)	34.32	35.13	33.65	1.47***(.249)	-.528 (.381)
Married	.398	.443	.377	.066***(.010)	.425	.445	.409	.036***(.009)	-.031* (.015)
N. of Children	.492	.602	.442	.160***(.019)	.601	.708	.513	.195***(.017)	.035 (.026)
Child. 0-2 years	.072	.079	.070	.009* (.004)	.079	.088	.072	.016***(.004)	.007 (.006)
Ethnic Minority	.034	.034	.033	.001 (.004)	.037	.040	.034	.005 (.004)	.004 (.005)
Education									
GCSE	.255	.212	.276	-.064***(.010)	.281	.269	.291	-.021* (.009)	.043* (.013)
A-Levels	.217	.198	.225	-.027* (.009)	.213	.193	.231	-.039***(.008)	-.011 (.112)
Degree	.448	.524	.414	.110***(.011)	.421	.455	.392	.063***(.010)	-.0471** (.015)
Student	.161	.113	.183	-0.70***(.007)	.168	.126	.203	-.080***(.006)	-.006 (.010)
Employment									
Unemployed	.289	.273	.297	-.024** (.091)	.403	.385	.418	-.033***(.008)	-.009 (.012)
Part Time	.037	.034	.038	-.004 (.003)	.195	.199	.192	.007 (.006)	.011 (.008)
Full Time	.674	.693	.665	.028** (.009)	.402	.417	.390	.026** (.008)	-.002 (.012)
Hours Worked	28.52	28.92	28.34	.582 (.369)	19.11	19.49	18.80	.690* (.280)	.108 (.456)
Hourly Income	11.97	12.71	11.61	1.099***(.187)	9.694	9.931	9.469	.461***(.138)	-.638* (.229)
Private Sector	.553	.546	.556	-.009 (.010)	.345	.347	.343	.004 (.008)	.014 (.013)
Professional	.262	.309	.242	.067***(.009)	.218	.241	.200	.041***(.007)	-.026* (.011)
Firm size >100	.298	.327	.285	.042***(.009)	.222	.231	.215	.016* (.007)	-.026* (.011)
PT									
Private	.005	.007	.004	.003** (.001)	.005	.007	.004	.003** (.001)	-.000 (.001)
Paid a Fee	.004	.005	.003	.002 (.001)	.004	.006	.003	.002** (.001)	.001 (.001)
N	9,317	2,906	6,411		11,105	5,028	6,077		

Note: the figures are individual proportions (or averages) over time, averaged over the number of individuals. PT is the abbreviation for psychotherapy. N is the number of individuals. The sample includes all male and female respondents aged 18-60, between the years 1995 and 2008. Hourly income is expressed in constant 2010 GBP. Earnings of the unemployed are included and set to zero.

Figure 1: Distribution of Psychological Issues

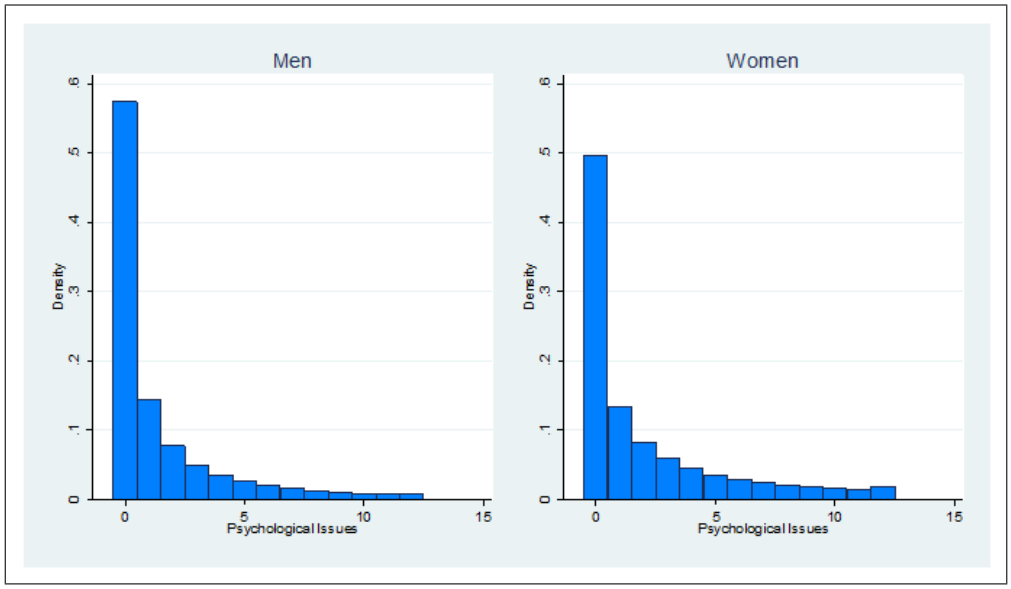

Table 4: FE Estimates of the Return to Consulting a Psychotherapist

	Men		Women	
	(1)	(2)	(3)	(4)
Psychotherapist	.123** (.038)	.124** (.043)	.101*** (.025)	.081** (.028)
Part time	.988***(.178)	1.06***(.187)	1.72***(.035)	1.63***(.054)
Full time	2.05***(.049)	1.93***(.065)	1.81***(.033)	1.66***(.050)
N. Children		.015 (.016)		-.060***(.012)
Children 0-2		.007 (.030)		.065** (.022)
Children 3-4		.034 (.028)		.015 (.021)
Marriage		.082* (.035)		.070** (.025)
Professional		.302***(.044)		.327***(.036)
Firm size		.109** (.034)		.077** (.028)
Profit		.105 (.060)		.064 (.045)
Paid Therapist		-.171** (.059)		.146 (.094)
Private Therapist		.180***(.041)		-.124 (.091)
Student		.135 (.073)		.074 (.045)
Age Dummies	No	Yes	No	Yes
Constant	.287***(.036)	.104 (.058)	.212***(.019)	.119** (.037)
NT	5,793	4,913	11,520	9,913
R^2	.647	.707	.622	.658

Note: standard errors in parentheses are clustered at the individual level. Income is the logarithm of hourly income (in constant 2010 GBP). Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 5: FE Estimates of Effect of Consulting a Psychotherapist on Mental Health

	GHQ Score		N. Psychological Problems	
	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
Psychotherapist	-.468 (.319)	-1.197***(.243)	-.503** (.175)	-.780***(.140)
Part time	-2.171***(.217)	-.849***(.131)	-1.211***(-.117)	-.474***(.074)
Full time	-2.032***(.195)	-1.069***(.148)	-1.121***(.105)	-.524***(.083)
N. Children	-.057 (.059)	-.090 (.059)	-.076* (.033)	-.070* (.035)
Children 0-2	.059 (.103)	.043 (.099)	.128* (.057)	.161** (.055)
Children 3-4	-.066 (.099)	.041 (.091)	-.029 (.056)	-.004 (.053)
Marriage	.121 (.119)	-.164 (.122)	-.075 (.065)	-.214** (.068)
Professional	-.064 (.086)	.006 (.089)	-.074 (.045)	-.021 (.050)
Firm size	.037 (.071)	.030 (.082)	.005 (.039)	.010 (.046)
Profit	.136 (.121)	.0216 (.0961)	.065 (.065)	-.031 (.054)
Paid Therapist	-.927 (.626)	-.654 (1.125)	-.260 (.336)	-.127 (.611)
Private Therapist	.815 (.597)	.806 (1.087)	.312 (.318)	.257 (.591)
Student	-1.968*** (.205)	-1.321*** (.173)	-.968*** (.110)	-.670*** (.0931)
Age Dummies	Yes	Yes	Yes	Yes
Constant	22.43***(.176)	24.58***(.145)	2.306*** (.094)	2.697*** (.081)
NT	43,350	56,547	43,350	56,547
R^2	.010	.004	.010	.005

Note: standard errors in parentheses are clustered at the individual level. Income is the logarithm of hourly income (in constant 2010 GBP). GHQ score varies between 12 (no reported problems) and 48. The number of psychological problems varies between 0 (no psychological problems) and 12. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 6: FE estimates of Predictors for Psychotherapy

	Men		Women	
	Coefficient	Standard Error	Coefficient	Standard Error
	(1)	(2)	(3)	(4)
Divorce	.021	(.028)	.008	(.030)
Health Affects Daily Life	-.023	(.020)	-.003	(.017)
Employment Status	-.022	(.019)	-.012	(.013)
Hours Worked	-.0004	(.0004)	-.0005	(.0004)
Hourly Income	.001	(.007)	-.003	(.006)
Yearly Income	.0005	(.0004)	-.0005	(.0006)
Moved House	.0197	(.010)	-.014	(.013)
NT	3,872		8,016	

Note: standard errors in parentheses are clustered at the individual level. Individual FE regressions. Controls include: working part time, working full time, being a full time student, being married, age dummies, number of children, dummies for age of children 0-2 and 3-4, size of firm, working for a private firm, being a professional, having used NHS or private psychotherapy in the previous year, having used free or payable psychotherapy in the previous year, and GHQ score. Asterisks represent significance levels: * $p<.05$, ** $p<.01$, *** $p<.001$ on two-sided tests.

Table 7: Alternative Specifications FE Estimates

	Men		Women	
	(1)	(2)	(3)	(4)
Original Model	.123** (.038)	.124** (.043)	.101***(.025)	.080** (.028)
Only Employed	.199***(.051)	.168** (.056)	.177***(.043)	.163***(.044)
All Mental Health Levels	.151***(.022)	.125***(.024)	.116***(.014)	.100***(.015)
Yearly Income	.179***(.048)	.183*** (.052)	.125*** (.029)	.082* (.032)

Note: standard errors in parentheses are clustered at the individual level. Individual FE regressions. The dependent variable is the logarithm of hourly labour income in constant 2010 GBP, except for the last case in which the dependent variable is the logarithm of thousands of constant 2010 GBP. Columns 1 and 3 show results of regressions in which the independent variables are having consulted a psychotherapy, working part time and working full time. Columns 2 and 4 includes all the other controls. These are: being a full time student, being married, age dummies, number of children, dummies for age of children 0-2 and 3-4, size of firm, working for a private firm, being a professional, having used NHS or private psychotherapy in the previous year, having used free or payable psychotherapy in the previous year. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 8: Gender Wage Gap Decomposition FE

	FE Model 1		FE Model 2	
	Endowment	Coefficient	Endowment	Coefficient
	(1)	(2)	(3)	(4)
Psychotherapist	-.011(-1.2%)	.005(2.7%)	-.011(-1.2%)	.011(2.4%)
Part time	-.177(-21.5%)	-.150(-81.6%)	-.204(-21.8%)	-.123(-27.5%)
Full time	.636(-77.2%)	.104(56.6%)	.638(68.2%)	.118(26.5%)
N. Children			-.002(-.25%)	.063(14.0%)
Children 0-2			-.001(-.01%)	-.005(-1.2%)
Children 3-4			-.001(-.1%)	.002(.4%)
Marriage			.001(.1%)	.006(1.4%)
Professional			.033(3.5%)	-.006(1.4%)
Firm size			.013(1.4%)	.008(1.8%)
For profit			.024(2.6%)	.014(2.7%)
Paid Therapist			.002(.2%)	-.014(-3.1%)
Private Therapist			-.002(-.2%)	.014(3.0%)
Full Time Student			.000(.0%)	.004(.9%)
Wage Gap	.483		.532	
Total	.449	.034	.493	.040

Income is the logarithm of hourly income (in constant 2010 GBP). The percentage contribution to the relative part of gender wage gap, calculated as the sum of the absolute value of all the variables, is indicated in parentheses. The total sums of all components of the decomposition, including age dummies and the constant, which are not reported in the table. The FE estimates used to calculate the decompositions are the same as those (partially) reported in Table 4.

Appendix

In order to check that our results are not caused by any upward bias we perform IV FE estimates. Our conjecture, consistent with the theoretical model, is that individuals are more inclined to consult a psychotherapist if the associate monetary and non monetary cost is low. More General Practitioners (GPs) and psychologists in the area imply a lower barrier to consulting a psychotherapist.[12] The ideal instrument would be the per capita regional number of GPs, social workers, and psychotherapists. However, such a measure is not available in historical data. The best proxy for that is the previous year percapita central government regional health expenditure. We gather data from the UK Public Expenditure Statistical Analyses (Pesa 1998, Pesa 1999, Pesa 2001, Pesa 2004, Pesa 2007, and Pesa 2011[13]), and use per capita total health expenditure (current and capital) allocated by the government expressed in thousands of 2010 GBP.

The instrument is exogenous since there is no reason to assume that the central government would allocate a higher level of health expenditure to richer regions: according to 2015 data by the University of York, the NHS service does not reflect the affluence of the area (Clinical Commissioning Group- CCG Inequality Indicators). To confirm this, in Table 9 column 1 and 2 show that higher health expenditure is not associated with higher income. Column 1 presents the average per capita regional health expenditure, while column 2 shows the average regional Gross Household Disposable Income between 1997 and 2008, gathered from ONS statistics. Both are expressed in thousands of constant 2010 prices. The correlation between household income and health expenditure is only 1.2%. It is possible to notice some differences between regions, even though there are no outliers, except perhaps Northern Ireland.

Table 10 shows the overall per capita average regional health expenditure by year at constant 2010 prices (not weighted by region), showing that the overall health expenditure is increasing over time.

A.1 Instrumental Variables Strategy

We divide the sample between men and women. We use a linear, constant-effects model that connects the annual labour earnings Y_{it} of agent i at time t, with having consulted a psychotherapist in the present or in the past P_{it}, and with a vector of personal characteristics X_{it}. The model also connects the annual labour earnings to a time-invariant effect u_i for each individual i as well as a random error component ϵ_{it} for the individual i at the specific time t. The model is:

[12] According to the British Mental Health Foundation (2013) "Around 12 million adults see their GP with mental health problems each year. Most of these suffer from anxiety and depression and much of this is stress-related. It's estimated that about 10.4 million working days are lost each year through anxiety and stress-related conditions, costing industry more than £3 billion."

[13] There is a possibility of small discrepancies between different Pesa issues, therefore we collected data from the lowest possible number of issues, that contain information about several years each.

$$Y_{it} = P_{it}\alpha + X_{it}\beta_i + u_i + \epsilon_{it} \tag{9}$$

Therefore, equation 9 describes the labour income under different previous period statuses about psychotherapist consulting, controlling for time-invariant unobserved skills and preferences u_i, for the unobserved time-varying skills and preference shock ϵ_{it}, and for the previously described effects X_{it}.

Consulting a psychotherapist in period t is as good as randomly assigned (see Table 6), but there is still a small chance that it might be correlated with u_i and ϵ_{it}, which might question the causal explanation shown by the FE estimates.

For this reason we perform IV FE estimates. Provided that it is reasonable to assume that after controlling for X_{it} and u_i, the effect of regional public health expenditure in period t on earnings in period t is solely due to the association of expenditure and consulting a psychotherapist, the FE IV estimation provides a causal interpretation.

In FE IV estimation, the first-stage equation between having consulted a psychotherapist P_{it}, regional health expenditure H_{rt-1} in period $t-1$, the set of controls X_{it} in period t, and u_i is

$$P_{it} = X_{it}\pi_0 + H_{it-1}\pi_1 + u_i + \xi_{it-1} \tag{10}$$

The error term ξ_{it-1} represents the residual from the work category of the population regression of P_{it} on X_{it}, u_i, and H_{it-1}.

A2. Instrumental Variables Estimates

Table 11 presents the first stage results of the 2sls analysis. It shows the FE estimates of regional health expenditure on consulting a psychotherapist, while Table 12 presents the results of the reduced form estimates, with FE estimating the indirect effect of public regional health expenditure on income. All the previously described controls apply, but standard errors are clustered at the regional level. This entails a small reduction in the dataset as all individuals who changed region had to be removed from the sample[14]. Table 11 shows precisely estimated positive coefficients for regional health expenditure for both men and women. For men the coefficients vary between .167 considering only work status and .166 adding all the other controls, with F-tests suggesting that the instrument is not weak (100.00 and 51.71 respectively).[15] Regional health expenditure is expressed in thousands of 2010 GBP, implying a considerable and plausible effect. A £1 increase in per capita health expenditure would correspond to a .02% increase in the probability of consulting a psychotherapist. In

[14] In Table 14 we show IV FE results by clustering at individual level, leaving individuals who moved region in the sample. Table 14 also presents the results of IV FE estimates with double clustering at regional and year levels.

[15] As a rule of thumb an instrument is considered strong when its F-statistic is bigger than 10 - see Stock, Wright, and Yogo (2003), and Angrist and Pischke (2008).

other words a 1.0% increase in health expenditure would increase the probability of consulting a psychotherapist by .25% on average.

For women we obtain estimates that are very consistent in magnitude and precisely estimated. They vary between .223 considering only work status and .228 adding all the other controls. Also in this case the F-statistics suggest strong instruments, with statistics that range from 65.38 to 57.95. These results imply that a 1.0% increase in health expenditure translates into a .34% increase in the probability of consulting a psychotherapist for women.

Table 12 shows the results of the reduced form estimates of the effects of public regional health expenditure, expressed in thousands of 2010 GBP, on the logarithm of hourly labour income expressed in 2010 GBP. These statistics include the same set of controls as Table 11, and standard errors are again clustered at the regional level. For men the coefficients vary between .272 considering only work status and .280 adding all the other controls, with F-tests that suggest once again strong significance (41.48 and 27.88 respectively). Also for women Table 12 show positive estimates of .210 and .194, precisely estimated with F-tests of 74.10 and 113.54. These results are plausible in terms of magnitude. Assuming the average respondent works 40 hours a week, these estimates imply that a £1 increase in health expenditure causes an increase in yearly income of about £5 for men and £2 for women.

Overall the first stage estimates (Table 11) and the reduced form estimates (Table 12), show that per-capita regional health expenditure is positively correlated with both the incidence of psychotherapy and the logarithm of hourly labour income. All results presented in Table 11 and Table 12 are significant and non-negligible in magnitude. Moreover, while the correlation between health expenditure and psychotherapy is bigger in magnitude for women, the effect of health expenditure on income is stronger for men.

Table 13 presents the results of the second stage of IV FE estimates. Once again we distinguish between men and women and cluster standard errors at the regional level. For men we obtain positive precise estimates adding only employment status controls (1.641) and adding the full set of controls (1.690). Both coefficients and impacts are much smaller in magnitude compared to the effect of working full time and bigger than the effect of working part time, which is not surprising given that only a very small percentage of men work part time in the sample.

Also for women we obtain precise positive estimates for both regressions. The coefficients for having consulted a psychotherapist vary from .941 adding only employment status controls, to .850 adding the full set of controls. For women, coefficients of consulting a psychotherapist are smaller than both full time and part time effects in both specifications.

Overall, it can be noticed that both in the FE estimates (Table 4) and in the IV FE estimates (Table 13) men benefit more than women from consulting a psychotherapist in each specification, even though men are less likely to consult a psychotherapist compared to women. Moreover, the IV FE estimates confirm the positive returns to consulting a psychotherapist and actually suggest that the FE estimates presented in Table 4 might be underestimating the impact of

therapy, but definitely do not point at an upward bias of the FE estimates.

IV FE estimate local average treatment effects (LATE), which are the returns among individuals who would have not consulted a psychotherapist if the health expenditure would have been lower. Since we are estimating LATE we do not make any claim about external validity. Individuals who are the most sensitive to health expenditure contribute the most to the average causal response (see Angrist, Graddy and Imbens, 2000). Finally, when calculating IV FE estimates on income using LATE, it is not rare to find impacts that are big in magnitude. For example Kugler and Sauer (2005) estimate the wage returns to re-licensing as a physician in a new country, and find percentage impacts between 180% and 340%.

In order to check for the robustness of the IV estimates we perform a battery of tests, replicating the estimations for both men and women in different conditions. Table 14 displays the results of the robustness checks: columns 1 and 3 show the estimates with employment status controls and 2 and 4 with all the controls, for both men and women.

First of all we replicate IV FE estimates re-introducing individuals who moved region and clustering at the individual level. Second, we repeat the estimates with two-way clustering by year and region. Third, we consider only individuals who are employed. Fourth, we include all the individuals irrespective of their mental health status, to make sure there is not a strong attrition bias. Fifth, we exclude London, as the capital could have a too high population per square kilometre and therefore interfere with the results. Moreover London might have much higher salaries on average compared to the rest of the UK. Sixth, we consider results for English regions only given the higher autonomy of Scotland, Wales and Northern Ireland, as well as the fact that Northern Ireland consistently has a higher level of per-capita public health expenditure. Seventh, we exclude having consulted a social worker from our psychotherapy endogenous variable. Eighth, we exclude all individuals who report working in healthcare (doctors, nurses, etc.). This control is performed to make sure there is not an endogeneity problem deriving from higher salaries for medical workers in public health expenditure increases, or more people from the sample being employed in the health care sector. Ninth, we exclude all individuals who report having any health problem other than mental health problems. Finally, we use the logarithm of yearly income (expressed in thousands of 2010 GBP) as dependent variable.

All estimates are still significant and relatively close in magnitude to the original estimates, except of course the last one, in which the dependent variable is on a different scale. Not only we find that individuals benefit from psychotherapy, but in all FE (Table 4), alternative FE (Table 7), IV FE (Table 13), and alternative IV FE (Table 14) estimates we find that the gender pattern is stable and consistent: men always benefit more than women from psychotherapy.

In Table 15 we present the result of the Oaxaca-Blinder decomposition using IV FE estimates. In this case the difference in the logarithm of hourly earnings between males and females is .474 with partial controls and .623 with full controls. The coefficients effects represent respectively 37.6% and 30.6% of the

wage gender gap.

Table 9: General Government Regional Public Health Expenditure and Per-capita Income

Region	Health Expenditure (1)	Income (2)
North East	1.523	13.192
North West	1.496	14.050
Yorkshire	1.405	13.941
East Midlands	1.269	14.351
West Midlands	1.362	14.111
East of England	1.423	16.616
London	1.479	19.577
South East	1.308	18.577
South West	1.277	15.793
Wales	1.529	13.489
Scotland	1.640	14.657
N. Ireland	1.723	13.663

Note: health expenditure is the regional general government health expenditure expressed in thousands of constant 2010 GBP.

Table 10: General Government Regional Public Health Expenditure by Year

Year	Health Expenditure (1)		Year	Health Expenditure (2)
1995	1.191		2002	1.394
1996	1.153		2003	1.529
1997	1.215		2004	1.633
1998	1.068		2005	1.715
1999	1.096		2006	1.793
2000	1.188		2007	1.849
2001	1.297		2008	1.922

Per-capita Income is the gross disposable household income between 1997 and 2008 expressed in thousands of constant 2010 GBP.

Table 11: IV First Stage - The Effect of Regional Health Expenditure on Consulting a Psychotherapist

	Men		Women	
	(1)	(2)	(3)	(4)
Health Expenditure	.167***(.017)	.166***(.023)	.223***(.028)	.228***(.030)
Part time	.017 (.046)	-.005 (.031)	.002 (.017)	-.015 (.021)
Full time	-.007 (.017)	-.034 (.025)	-.003 (.011)	-.017 (.018)
N. Children		-.022 (.011)		-.017 (.012)
Children 0-2		.007 (.024)		-.031 (.013)
Children 3-4		.028 (.018)		-.007 (.016)
Marriage		.-.018 (.023)		-.053 (.025)
Professional		.014 (.020)		-.005 (.009)
Firm size		-.007 (.011)		-.011 (.015)
For profit		.022 (.017)		.013 (.009)
Paid Therapist		.063 (.141)		.210***(.040)
Private Therapist		.069 (.128)		-.024 (.043)
Full Time Student		-.006 (.036)		-.050 (.023)
Age Dummies	No	Yes	No	Yes
F-test	100.00(.000)	51.71(.000)	65.38(.000)	57.95(.000)
NT	3,001	2,911	6,718	6,578
R^2	.050	.077	.062	.116

Note: standard errors in parentheses are clustered at the regional level. Income is the logarithm of hourly income in constant 2010 GBP. Per-capita regional health expenditure is expressed in thousands of constant 2010 GBP. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 12: Reduced Form Estimates of the Effect of Regional Health Expenditure on Log of Hourly Income

	Men		Women	
	(1)	(2)	(3)	(4)
Health Expenditure	.272***(.042)	.280***(.053)	.210***(.024)	.194***(.018)
Part time	1.02***(.168)	1.06***(.143)	1.70***(.051)	1.61***(.072)
Full time	2.04***(.074)	1.91***(.056)	1.76***(.055)	1.63***(.075)
N. Children		.014 (.019)		-.045* (.016)
Children 0-2		.014 (.035)		.078** (.025)
Children 3-4		.018 (.025)		.019 (.022)
Marriage		.021 (.038)		.040 (.028)
Professional		.242***(.034)		.261***(.036)
Firm size		.112** (.029)		.076* (.026)
For profit		.111* (.050)		.080 (.070)
Paid Therapist		-.158 (.092)		.067 (.121)
Private Therapist		.170* (.073)		-.050 (.115)
Student		.176 (.095)		.136 (.075)
Age Dummies	No	Yes	No	Yes
Constant	-.054 (.081)	-.250* (.087)	-.019 (.051)	-.079 (.047)
F-Test	41.48 (.000)	27.88 (.000)	74.10 (.000)	113.54 (.000)
NT	4,181	4,064	8,516	8,366
R^2	.670	.706	.626	.655

Note: standard errors in parentheses are clustered at the regional level. Per-capita regional health expenditure is expressed in thousands of constant 2010 GBP. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 13: IV FE Estimates of the Returns to Consulting a Psychotherapist

	Men		Women	
	(1)	(2)	(3)	(4)
Psychotherapist	1.641***(.311)	1.690***(.420)	.941***(.126)	.850***(.119)
Part time	.989***(.156)	1.073***(.133)	1.695***(.054)	1.621***(.069)
Full time	2.055***(.069)	1.962***(.068)	1.765***(.056)	1.643***(.070)
N. Children		.052** (.018)		-.060***(.018)
Children 0-2		.002 (.052)		.104***(.029)
Children 3-4		-.030 (.048)		.025 (.022)
Marriage		.052 (.055)		.085** (.031)
Professional		.219***(.036)		.265***(.034)
Firm size		.124** (.031)		.086** (.027)
For profit		.073 (.060)		.069 (.065)
Paid Therapist		-.265 (.191)		-.111 (.114)
Private Therapist		.054 (.158)		-.030 (.090)
Full Time Student		.188 (.109)		.179* (.070)
Age Dummies	No	Yes	No	Yes
NT	3,001	2,911	6,718	6,578

Note: standard errors in parentheses are clustered at the regional level. Income is the logarithm of hourly income in constant 2010 GBP. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 14: Alternative Specifications IV FE Estimates

	Men		Women	
	(1)	(2)	(3)	(4)
Original Model	1.641***(.311)	1.690***(.420)	.941***(.126)	.850***(.119)
Clustered by Resp.	1.584***(.309)	1.667***(.351)	1.040***(.146)	.958***(.151)
Clust. by Year & Reg.	1.641***(.331)	1.690***(.420)	.941***(.126)	.850***(.119)
Employed Only	2.125***(.312)	2.617***(.664)	1.728***(.225)	1.874***(.292)
All Mental Health Levels	3.549***(.363)	4.046***(.401)	2.441***(.146)	2.342***(.156)
Excluding London	1.638***(.315)	1.662***(.414)	.918***(.120)	.813***(.104)
Exc. N.Ire,Scot.,Wales	1.864***(.396)	2.224***(.649)	1.158***(.213)	1.070*** (.218)
Exc. Social Workers	1.805***(.348)	1.882***(.487)	1.147***(.182)	1.082***(.184)
Exc. Health Workers	1.603***(.307)	1.620***(.414)	.842***(.117)	.790***(.124)
Exc. Health Problem	2.309***(.541)	2.433***(.777)	1.326***(.180)	1.281***(.198)
Yearly Income	1.794***(.335)	1.981***(.530)	1.085***(.140)	1.005***(.141)

Note: standard errors in parentheses are clustered at the regional level, unless specified otherwise. Income is the logarithm of hourly income in constant 2010 GBP, while yearly income is expressed in thousands of constant 2010 GBP. Columns 1 and 3 show results of regressions in which the independent variables are having consulted a psychotherapy, working part time and working full time. Columns 2 and 4 includes all the other controls. These are: being a full time student, being married, age dummies, number of children, dummies for age of children 0-2 and 3-4, size of firm, working for a private firm, being a professional, having used NHS or private psychotherapy in the previous year, and having used free or payable psychotherapy in the previous year. Asterisks represent significance levels: * p<.05, ** p<.01, *** p<.001 on two-sided tests.

Table 15: Gender Wage Gap Decomposition IV FE

	IV FE Model 1		IV FE Model 2	
	Endowment	Coefficient	Endowment	Coefficient
	(1)	(2)	(3)	(4)
Psychotherapist	-.150(14.5%)	.171(37.6%)	-.156(14.1%)	.205(30.6%)
Part time	-.199(19.2%)	-.159(35.0%)	-.217(19.6%)	-.123(18.4%)
Full time	.687(66.3%)	.125(27.4%)	.663(60.0%)	.136(20.2%)
N. Children			-.009(-.8%)	.096(14.3%)
Children 0-2			.000(.0%)	-.010(1.4%)
Children 3-4			.001(.1%)	-.005(.8%)
Marriage			.000(.0%)	-.017(2.6%)
Professional			.021(1.9%)	-.011(1.7%)
Firm size			.015(1.4%)	.009(1.4%)
For profit			.017(1.6%)	.001(.2%)
Paid Therapist			.003(.3%)	-.006(1.0%)
Private Therapist			-.001(.1%)	.005(.5%)
Full Time Student			.001(.0%)	.000(.1%)
Wage Gap	.474		.623	
Total	.338	.136	.339	.285

Note: income is the logarithm of hourly income in constant 2010 GBP. The percentage contribution to the relative part of gender wage gap, calculated as the sum of the absolute value of all the variables, is indicated in parentheses. The total sums of all components of the decomposition, including age dummies, which are not reported in the table. The IV FE estimates used to calculate the decompositions are the same as those (partially) reported in Table 11.