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Working Paper

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GLO Discussion Paper, No. 1468

Provided in Cooperation with:

Global Labor Organization (GLO)

Suggested Citation: Gonçalves, Judite; Rocha-Gomes, João; Amorim-Lopes, Mário; Martins, Pedro S. (2024) : What is (behind) the gender gap in sickness benefits? Evidence from administrative data, GLO Discussion Paper, No. 1468, Global Labor Organization (GLO), Essen

This Version is available at:

<https://hdl.handle.net/10419/300594>

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What is (behind) the gender gap in sickness benefits? Evidence from administrative data*

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Abstract

Women appear to take sick leave at a higher rate and for longer periods than men. However, the reasons for these differences are poorly understood. This study starts by outlining several channels (biological, psychological, socio-economic, and occupational) that may drive this gender gap. We then analyse rich individual longitudinal administrative data on employment and sickness benefits. We consider the case of Portugal, where sickness benefits are relatively generous, in contrast to other potentially related social support (such as childcare). We find that women's adjusted monthly odds of receiving sickness benefits are 1.66 times those of men. This ratio falls to 1.37 when considering only hospitalisation-initiated sickness benefits, which may be driven exclusively by health factors. Overall, our results suggest that biological factors, as well as work-related hazards and stressors, play a large role in the gender gap in sickness benefits; yet behavioural and socioeconomic factors are non-negligible. For example,

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more women may use sickness benefits to accommodate caregiving responsibilities, and more men may forgo statutory sick leave to provide for their family. Our findings underscore the importance of more evidence for the enhancement of health and equity at work. Improved social and workplace policies to mitigate the double burden of work and family responsibilities, laying mostly on (poorer) women, may be needed, also to increase fair use of sickness benefits.

Keywords: Sick leave, Gender inequality, Hospitalisation, Diagnosis, Caregiving responsibilities

JEL codes: I18, H55, J28

* We thank Ricardo Biscaia, Ludovica Ciasullo and conference participants at the European Health Economics Association (Vienna) for comments. Corresponding Author: Pedro S. Martins, Nova School of Business and Economics, NOVA University Lisbon, Rua da Holanda, 1, 2775-405 Carcavelos, Portugal. E-mail: pedro.martins@novasbe.pt. Web: <https://pmrsmartins.wixsite.com/website>

1. Introduction

Women tend to collect sickness benefits at a higher rate than men. Across 17 European countries in 1998-2008, women were 30% more likely than men to be absent from work in any week due to sickness, with large heterogeneity across countries (Mastekaasa & Melsom, 2014). Controlling for a range of health factors, as well as work and family stressors, explains only part of the gender gap in sickness absence (Østby et al., 2018). Taken at face value, these findings suggest that working-age women are at a significant disadvantage, compared to men, in terms of health and well-being (de Blas et al., 2012; Fontaneda, López, et al., 2019; Laaksonen et al., 2008; Nilsen et al., 2017), adding to the much better-documented disadvantages in terms of career opportunities and pay (Blau & Kahn, 2017). Understanding this gender health-related gap is essential to reform workplace and social security policies for the enhancement of health, productivity, and gender equality (Harknett & Schneider, 2022). In this paper, we leverage rich administrative data, representative of Portuguese employees, to shed new light on the gender gap in sickness benefits and its determinants.

Gender disparities in sick leave uptake and duration may arise from a complex interplay of biological, psychological, and socioeconomic determinants, occupational hazards, and the wider context of labour institutions and social policies, which we summarised in Figure 1. Reproductive biology and gender-specific medical conditions may lead women to utilise more healthcare than men (Bernstein et al., 2023). Women have higher likelihoods of ailing owing to mental illness like depression and anxiety, autoimmune and inflammatory conditions such as arthritis, irritable bowel syndrome, and thyroid disease (Bernstein et al., 2023; Crimmins et al., 2019). Higher incidence of these conditions can also lead to greater frequency of sickness leave among women (Holmlund et al., 2022; Rashid, 2019; Schoep et al., 2019).⁵ In contrast, men have higher incidence of cardiovascular, lung, kidney, and liver diseases, which are sometimes fatal (Bernstein et al., 2023; Crimmins et al., 2019; Vlassoff, 2007). However, the gender gap in sickness absence cannot be fully explained by differences in health. For instance, adjusting for a range of health factors accounted for only about 22-24% of the observed gender difference in sickness absence in Østby et al. (2018).

⁵Labour and social policies also play a role here. For example, Spain became, in February 2023, the first European country to introduce menstrual leave (Widiss, 2023).

[Figure 1 about here.]

Turning to psychological/behavioural differences, women often overestimate their vulnerability to health risks and tend to be more cautious than men in their health-related decisions (Alsharawy et al., 2021; Kim et al., 2018). This risk aversion may be attributed to high sensitivity to potential losses and intense emotional response to health-related risks (Eckel & Grossman, 2008; Harris & Jenkins, 2006). These factors likely play a role in the adoption of protective health behaviours, with women being more altruistic than men in various settings and attributing more subjective value to prosocial behaviour (Okten et al., 2020; Tan et al., 2021). Greater risk aversion and altruism in this context could explain greater sick leave uptake by women, both to avoid getting sick and to prevent contagion of others. This highlights the importance of sickness benefits for protecting public health (OECD, 2020; Stearns & White, 2018). With regards to stressors and psychological health, depending on country setting (e.g., cultural aspects, family-friendly social policies), women may be exposed to greater stress from balancing work and family responsibilities (i.e., double burden hypothesis; Nilsen et al., 2017), while men may face additional stress from being the main breadwinner (Gonalons-Pons & Gangl, 2021).

Socioeconomic factors, including the gender pay gap, have also emerged as fundamental causes of different health outcomes and sick leave uptake between women and men (Angelov et al., 2020; Blau & Kahn, 2017; Braveman & Gottlieb, 2014). The male-breadwinner model, whereby men are primarily responsible for earning income for the family and which still prevails in many societies, can discourage sick leave uptake by men, even when necessary (i.e., presenteeism; Kanji & Samuel, 2017). Nevertheless, women may sometimes also engage in presenteeism, for example to fight discriminatory barriers to career advancement.⁶ Although literature linking workplace negotiation power and sickness benefits with a gender lens is non-existent, it is possible that men generally have greater negotiation power, which could give them access to discretionary benefits such as extra-statutory sick pay or other special paid leave (allowing them to forgo statutory

⁶ Examples of such barriers are the sticky floor and the glass ceiling hypotheses (Yap & Konrad, 2009). The sticky floor hypothesis posits that a discriminatory employment pattern keeps workers, primarily women, in lower-ranking positions, leading to low wages, limited job mobility, and invisible barriers to career advancement (Shabsough et al., 2021). The glass ceiling hypothesis posits that there is an unacknowledged barrier to career advancement, particularly affecting women and minority groups, especially in higher-ranking positions (Babic & Hansez, 2021; Fapohunda, 2018).

sickness benefits).⁷ Women's tendentially lower wages within the couple imply a lower opportunity cost of missing work, for example to take care of sick children or dependent aged parents (Angelov et al., 2020).⁸ This undue utilisation of sick leave is dependent on countries' social policies, e.g., possibility of taking paid leave to take care of dependants, availability of social care (Jankowski, 2011; Matysiak & Węziak-Białowolska, 2016).

Owing to the predominantly different occupations of men and women, men are more prone to workplace accidents and more often exposed to chemical, biomechanical, noise, and other hazards, while women are more often exposed to work stress and biological hazards (Biswas et al., 2021).⁹ Occupations also differ in terms of work demands and autonomy ((Karasek & Theorell, 1990)), which determine how stressful a job is. Some especially stressful occupations may be female-dominated while others may be male-dominated. Additionally, women may be more vulnerable to the stressors associated with a given job (Casini et al., 2013; Mastekaasa & Melsom, 2014).

Lastly, it is important to note that the factors influencing the gender gap in sickness benefits are dynamic and introduce sample selection bias in empirical studies, especially at older ages. For example, fatalities from cardiovascular diseases and workplace accidents may lead to more men leaving worker samples as age increases than women (Biswas et al., 2022; Gonçalves et al., 2023). Women's greater risk aversion may result in greater sick leave uptake at young ages but fewer sickness episodes later, assuming risk aversion contributes to health maintenance. Family responsibilities falling disproportionately on women may induce some undue sickness benefit episodes, for instance to take care of children or dependent aged parents, and may also lead to selection out of the sample of workers (Van Houtven et al., 2013; Zamarro & Prados, 2021). All in all, fully explaining the gap in sick leave uptake between men and women is challenging.

Depicted as all-encompassing in Figure 1, institutional aspects such as labour and social policies may also explain larger or narrower gender gaps in sick leave uptake and duration

⁷ For example, in the US, while on leave, fewer women than men receive full pay (32 percent versus 55 percent), and more receive no pay (41 percent versus 25 percent) (Herr et al., 2018). Men are likely to have greater negotiation power than women for various reasons, including generally occupying higher ranking positions and dominating sectors with stronger unions or better collective bargaining agreements (Bryson & Forth, 2017).

⁸ A parental health shock further creates a caregiving penalty on earnings, increasing the overall gender pay gap (Brito & Contreras, 2023).

⁹ It is also possible that for similar exposure to chemicals or other agents, women may be more vulnerable and suffer more in terms of health. For example, a recent study shows that women are more vulnerable to air pollution than men (Liu et al., 2020).

across (and within) countries. This includes the design of sickness benefits (eligibility, waiting period, duration, replacement rate, ceilings, monitoring, sanctions) and stringency of medical assessments and certification. Previous research suggests that physicians' sickness certification practices vary widely, and some misuse of sick leave exists (von Knorring et al., 2008). Additionally, waiting times for exams and treatments can lead physicians to issue sickness certificates for longer periods than necessary (Bränström et al., 2013).

Overall, despite differences in magnitude across countries, there is a gender gap with women having higher uptake and duration of sick leave (Casini et al., 2013; Fontaneda, Camino López, et al., 2019; Laaksonen et al., 2008, 2010; Leinonen et al., 2018; Mastekaasa, 2014; Mastekaasa & Melsom, 2014; Nilsen et al., 2017; Østby et al., 2018; Timp et al., 2024). In 1998-2008, women were at least 50% more likely than men to be absent from work in any week due to sickness in Denmark, Hungary, Ireland, Norway, Sweden, and the UK, with Austria and Germany being the only two countries out of 17 showing almost no gap (Mastekaasa & Melsom, 2014). The gaps are not eliminated, and may even widen, when the comparison is between men and women in the same occupation (Laaksonen et al., 2010; Mastekaasa & Melsom, 2014). Another cross-country study also reveals widening gaps between 1984 and 2008 in five out of eight European countries considered (Mastekaasa, 2014). Controlling for a range of health factors, as well as work and family stressors, reduces the estimated gender gap in sickness absence only partially (Casini et al., 2013; Østby et al., 2018). A few studies point toward heterogeneity across categories of diagnoses underlying sickness episodes (Laaksonen et al., 2010; Leinonen et al., 2018; Timp et al., 2024).

Motivated by the large gender gaps in sickness benefits, with their many potential drivers and still poorly understood, we sought to contribute to their understanding using rich social security data from Portugal, 2005-2012. Most available evidence comes from the Nordic countries and, given the importance of institutions and policies to explain the gender gap in sickness benefits, new learnings from other country contexts are important. Portugal is a Southern European country with relatively generous sick leave policies compared to its European counterparts (Spasova et al., 2016), but where other social policies are less generous (e.g., availability of day care and social care for adults; Privalko et al., 2019). Compared to survey data used in many previous studies, our administrative data come with the advantages of a large sample, representative of the population working

in private sector companies across all industries, and not subject to recall biases. Moreover, our data include and distinguish sick leave episodes initiated by hospitalisation, which should not be affected by the socioeconomic drivers outlined above (e.g., undue use of sick leave to take care of dependants). Lastly, for a subsample of hospitalisation records, we can investigate the gender gaps across diagnosis categories, to shed further light on some of the biological and occupational drivers of the gender gap in sickness benefits.

2. Institutional background

In Portugal, all workers, including the self-employed, are entitled to sickness benefits. To access sickness benefits, a medical certificate from a doctor, stating the reason for and expected duration of absence, is required. In line with most European countries, there is a three-day waiting period between the onset of a sickness episode (and suspension of work) until a sickness benefit starts to be paid, to deter undue use of statutory sick leave. The self-employed are subject to a 10-day waiting period. During 2005-2012 (our sample period), the replacement rate was 65% of forgone wages for the first 90 days of sick leave, 70% from the 91st to the 365th day, and 75% from the 365th day onwards.¹⁰

In case of hospitalisation—including urgent or planned admission and including single-day outpatient surgery—there is no waiting period. Urgent admissions usually result from acute events and are unlikely to correspond to undue use of sick leave. Planned admissions are scheduled by the hospital and thus also untimed by individuals, especially as waiting lists tend to be long (i.e., individuals are unlikely to pass scheduled interventions, because they will be pushed to the end of the list).¹¹

Workplace accidents are not within the remit of statutory sickness benefits. Any healthcare charges resulting from workplace accidents and indemnities owed to the worker are covered by Workers Compensation Insurance, which is compulsory private insurance purchased by employers. Workplace accidents are therefore outside of our empirical analysis.

¹⁰ During the first eight months of 2005, the replacement rate was 55% for the first 30 days of sick leave, and 60% from the 31st to the 90th day. Sickness benefits are granted for a maximum of 1095 days for wage workers and 365 days for self-employed individuals (Law-decrees 28/2004, 133/2012 and 146/2005).

¹¹ With the expansion of private hospitals in more recent years, patient-driven cancellations of scheduled interventions in National Health Service hospitals may have been increasing, namely among wealthier patients. Nevertheless, during the 2005-12 period analysed here, the private sector was relatively small.

There are specific social security benefits in the cases of maternity/paternity, adoption, high-risk pregnancy, abortion, sick or disabled child in need of attendance, and sick or disabled grandchild in need of attendance (the latter since 2009; Law-decree 91/2009). However, it is generally not possible to take paid leave to assist other dependants, like an aged parent. (Subsidised) formal long-term care, as well as childcare, are not widely available, especially during the period under analysis here. The female employment rate in Portugal is high by European standards (~68% in 2019), especially among women with small children, at almost 83% (Marques et al., 2021). Part-time employment is relatively rare at 12.5% in 2017; women work on average almost as many hours per day as men for compensation, but almost twice as many hours without compensation (CIG, 2017). There was a 16.7% gender pay gap in 2017 (CIG, 2017). Even though male uptake of shared parental leave has been evolving since benefits for shared leave were introduced in 2009, less than 30% of new fathers shared parental leave in 2015 (CIG, 2017). Taken together, these factors mean that women in Portugal face a significant double burden from work and family responsibilities.

3. Methods

3.1. Data

We use administrative data from the Portuguese Ministry of Labour, Solidarity and Social Security. The dataset is a random sample such that included individuals represent both: a) at least 1% of all individuals who pay Social Security contributions and b) at least 1% of all individuals who receive sickness, maternity, or other benefits from Social Security, stratified by region and gender (Gonçalves & Martins, 2021). For individuals selected into the sample, we observe them monthly between January 2005 and February 2012, including all sick leave episodes that originate sickness benefits (i.e., spells beyond the waiting period). The dataset records the start and end dates of sickness benefits, replacement rate, and amount received (product of the beneficiary's reference pay and the replacement rate, which depends on spell duration; Section 2). We can distinguish between regular sickness spells and spells associated with hospitalisation.

The database also provides remuneration and demographic information (sex, age, nationality), but not information regarding industry or occupation or diagnosis leading to the sickness spell. Nevertheless, we were able to match a subset of sick leave episodes

associated with hospitalisation to the national diagnosis-related groups (DRG) dataset, to explore the medical conditions behind this more severe type of sick leave episode. The DRG data were provided by the Central Administration of the Portuguese Health System (ACSS) and included individual-level information on all inpatient and outpatient admissions to National Health Service hospitals during 2005-2011.

There is not a personal identifier allowing to match individuals in the social security and DRG datasets directly. We indirectly matched hospitalisations in the two administrative registries based on individuals' gender, year of birth, municipality of residence, and day of admission. We found an exact match in the DRG data for about half the hospital admissions in the social security database in 2005-2011. The other half correspond to multiple observations with the same values of the matching variables and hospitalisations in private hospitals, which are not recorded in the DRG dataset.

We restricted the sample to individuals aged 18 (compulsory schooling age) to 65 (statutory retirement age). As we only observe spells beyond the waiting period and self-employees have a 10-day waiting period, compared to a 3-day waiting period for employees (Section 2), we excluded self-employees. The general Social Security system only started to include public servants since 2006, therefore public servants are also not included here. In sum, our data are representative of wage workers. According to 2011 Census data, in that year there were 3.72 million wage workers, 0.68 million self-employed workers, and 0.73 million public servants.

The final dataset includes 6,852,429 person-month observations spanning the period between January 2005 and February 2012 (86 months). There are 128,234 different individuals observed in 53.4 months on average. There are 156,005 person-months with a sickness benefit record of any kind (2.28% of the total observations) and 11,279 (0.16%) person-months with a hospitalisation record. Crossing the Social Security data with the DRG data (limited to 2005-2011) allowed us to identify the underlying diagnoses of 5,366 hospitalisations, corresponding to a match rate of 48.22%.

3.2. Dependent variables

We generated five dependent variables. The first was a binary indicator capturing whether the individual claimed sickness benefits in a given month. The second was a categorical variable capturing duration of sickness benefits (1-5 days, 6-10 days, 11+ days, and no

benefits as the reference). The third was another binary indicator capturing whether the individual claimed sickness benefits due to hospitalisation (reference: no benefits or regular sickness benefits). The fourth was a categorical variable corresponding to large groups of the international classification of diseases, including a category “Other” to absorb diagnoses that were not very common, a category “Unknown” that included hospitalisations that did not have an exact match in the DRG data (Section 3.1), and a category “No hospitalisation” as the reference. The “Other” category also included diseases of the female/male genital tracts, as well as pregnancy and childbirth, as these categories did not vary with gender. In a similar fashion and taking advantage of the information available in the DRG dataset, we created the fifth dependent variable, which was another categorical variable capturing whether the hospitalisation was urgent or planned (plus the “Unknown” and “No hospitalisation” categories).

3.3. Statistical analyses

To quantify the associations between gender and (a) likelihood of receiving sickness benefits and (b) likelihood of hospitalisation in a given month, we estimated logistic regression models. To quantify the associations between gender and (c) duration of sickness benefits, (d) diagnosis related groups, and (e) type of hospital admission, we estimated multinomial logit models.

The models controlled for age (ten-year age groups), foreign status (Portuguese or foreigner), and time fixed effects (86 binary indicators for each month). We also estimated the empty model, without controls, for comparison.

For each dependent variable, we conducted the estimations on the full sample, on the subsample of individuals 50 years and older, and by wage (below and above the median). When individuals were on sick leave, we estimated the daily wage using information on the replacement rate and amount of sickness benefits. Since wage is endogenous, we opted for not including it as a covariate and only used it as a stratification variable. To account for inflation, we computed the median daily wage by month. Lastly, we dropped the bottom and top 1% of the distribution to exclude outliers. These observations were only excluded in the analyses by wage.

We reported odds ratios (OR) from the binary logit models and relative risk ratios (RRR) from the multinomial logit models. Standard errors were adjusted for individual-level clustering.

4. Results

4.1. Summary statistics

In our sample, there were 3.65 million person-month observations corresponding to female workers and another 3.21 million to male workers. The unadjusted monthly incidence of sickness benefits was 2.79% for women and 1.70% for men, and the incidence of hospitalisation was 0.19% for women and 0.14% for men. Additional summary statistics are available in Table 1.

[Table 1 here.]

4.2. Associations between gender and sickness benefits

The adjusted odds of receiving sickness benefits in a given month for women were 1.66 times the odds for men ($p < 0.01$, second column of Table 2). Regarding the decomposition into different benefit durations, the relative risks of receiving benefits (women versus men) were larger for longer spells (RRR: 1.54 for spells up to 5 days, RRR: 1.78 for spells of 6 to 10 days, and RRR: 1.76 for spells 11+ days; $p < 0.01$).

The previous results were driven mainly by individuals with below-median wages, although the odds/risk ratios were large even in the above-median wage sample. The main difference between low and high wage samples was for the longer spells of 11+ days: while among low wage workers, women were 1.71 times as likely as men to receive sickness benefits for 11+ days (versus no benefits), among high wage workers, women were only 1.40 times as likely as men to receive benefits for that long ($p < 0.01$). The estimated OR/RRR were smaller but still sizeable among workers 50 years and older.

[Table 2 here.]

4.3. Associations between gender and hospitalisation

The adjusted odds of hospitalisation for women were 1.37 times the odds for men ($p < 0.01$, Table 3, second column). The OR were similar between low and high wage workers, and not statistically different from one in the 50+ sample.

Zooming in on diagnosis groups, we uncovered huge heterogeneity. For some diagnosis categories, men were the ones with higher risk (i.e., RRR below one). This was the case for “Diseases of the Ear, Nose, Mouth, and Throat”, “Diseases of the Respiratory System”, and “Diseases of the Digestive System”. For others, there were no statistically significant differences between genders ($p > 0.05$), namely for “Diseases of the Circulatory System”, “Diseases of the Musculoskeletal System and Connective Tissue”, “Diseases of the Kidney and Urinary System”, “Diseases of the Hepatobiliary System and Pancreas”, and “Mental Disorders”, although for the two latter, the RRR were large in magnitude (indicating higher risk for women) and it was likely an issue of statistical power. For the remainder diagnosis categories—“Diseases of the Nervous System”, “Diseases of the Skin and Subcutaneous Tissue”, “Endocrine, Nutritional and Metabolic Diseases”, and “Myeloproliferative and Poorly Differentiated Disorders”—, women had significantly higher risk of hospitalisation than men. For example, women were 1.60 times as likely as men to be hospitalised with a disease of the nervous system (adjusted RRR: 1.60, $p < 0.01$). For the most part, RRR were larger in the low wage sample, indicating greater hospitalisation risks for women. The 50+ sample may have lacked statistical power, yet results were in line with expectations, e.g., very large relative risk of hospitalisation for “Diseases of the Musculoskeletal System and Connective Tissue” for women. This category includes for example knee and hip replacement procedures, which are often associated with osteoporosis; a disease much more common among women, especially after 50 years old (Barcelos et al., 2023a, 2023b).

Lastly, we did not observe a gender-differentiated risk in the likelihood of urgent admissions overall; however, women 50+ were only 0.68 times as likely as men to be hospitalised through the emergency department ($p < 0.05$). This means that the gender gap in hospitalisation comes from planned admissions (adjusted RRR in the full sample: 1.42, $p < 0.01$).

[Table 3 here.]

5. Discussion

This study quantified and shed light on the determinants of the gender differences in sickness benefits using rich administrative data for Portugal. There are four main findings. First, we found large gender gaps in both incidence and duration of sickness benefits, with women facing odds of receiving sickness benefits 1.66 times those of men, and even higher odds ratios for longer sickness spells ($p < 0.01$, OR adjusted only for age, nationality, and time fixed effects). Second, there was a much smaller but still large odds ratio for hospitalisation incidence, with women's odds of hospitalisation 1.37 times those of men ($p < 0.01$). However, this estimate hid substantial heterogeneity across diagnosis categories, including higher hospitalisation risks for men for several groups of diagnosis. Third, the estimated odds/risk ratios for women versus men were more pronounced among workers with below-median wages. This was true for all sickness benefits and for hospitalisation specifically. Fourth, among workers 50 years and older, there were still large odds/risk ratios (women versus men) for sickness benefit incidence and duration, but smaller than when considering all workers. With exceptions for a few diagnoses, the gender ratios for hospitalisation mostly dissipated in this older age group.

Our first finding is in line with previous evidence of large gender gaps in sickness benefits, from other countries and, particularly, from Portugal (Mastekaasa, 2014; Mastekaasa & Melsom, 2014). (Mastekaasa & Melsom, 2014) used Labour Force Survey data for 1998-2008 and estimated the odds of sickness absence for women at 1.62 times the odds for men, which is nearly identical to our administrative data-based estimate. Their weighted estimate across 17 European countries was $OR = 1.34$, with only three countries in their sample having higher OR than Portugal (Ireland, Norway, and Sweden). Their results thus suggested that the gender gap in sickness benefits in Portugal was high in cross-national comparison, likely owing to a complex mix of biological, psychological/behavioural, socioeconomic, occupational, as well as institutional factors (Section 1) that we explored in the present study. Previous studies on sickness benefit duration focused on specific populations, e.g., municipal employees in Finland, occupational accidents or absences related with musculoskeletal disorders in Spain (Arcas et al., 2016; Fontaneda, Camino López, et al., 2019; Laaksonen et al., 2010), limiting comparability with our study. Nevertheless, most of the literature found that women tend to have longer spells than men, which is qualitatively aligned with our results.

Two previous studies looking into diagnoses behind sickness absence, from Finland and the Netherlands, also found substantial differences in the extent of gender differences by diagnosis categories (Laaksonen et al., 2010; Timp et al., 2024). Besides the different context, our study differed in that identification of diagnoses was limited to hospitalisation episodes. Yet, our study and theirs found higher risk/sickness duration for diseases of the nervous system, the skin, and endocrine diseases among women, and men had higher risk of diseases of the digestive system in both our study and (Laaksonen et al., 2010). Both of those studies found women to be especially vulnerable to absence due to musculoskeletal diseases; we also estimated a very high-risk ratio for this group of diseases, but only in the 50+ sample (RRR=2.04, $p<0.01$). We found no gender difference in the general sample likely because at young ages, musculoskeletal troubles, like pain, do not often lead to hospitalisation.

Not many studies have estimated gender gaps in sickness benefits along the wage and age distributions (studies considering differences across education levels have found mixed results (Kaikkonen et al., 2015; Magnusson et al., 2024)). Nevertheless, our fourth finding is in line with a recent study from Sweden that found more pronounced gender gaps in sickness benefits among those ages 30 to 49, and less pronounced among those below 30 and those 50 and above (Magnusson et al., 2024).

The large gender gap in sickness benefits found in this study has a range of underlying factors and may still be underestimated (Section 1). Since our data exclude sickness spells under three days (except in hospitalisation cases), where benefits are not paid because of the waiting period, we suspect that our main result does not reflect many of the potential cases of missed work to avoid becoming ill or contagion of others (i.e., behavioural factors, Figure 1), which may be more prevalent amongst women. Short absences for taking care of dependants (e.g., taking a child or an aged parent to the doctor, which classifies as undue use of sick leave) were also not captured in the data, and neither were some ailments affecting predominantly women, including menstruation-related symptoms (Herrmann & Rockoff, 2013; Schoep et al., 2019). Nevertheless, behavioural factors and undue use of sick leave for longer periods may still have played a role.

By looking at sickness benefits associated with hospitalisation, we attempted to rule out those behavioural factors, including individual preferences, as well as socioeconomic ones; we obtained a much smaller OR at 1.37, compared to 1.66 when considering all sickness benefits. Although smaller, OR=1.37 is still large, suggesting that biological

factors, as well as work-related hazards and stressors that lead to different incidences of illness between women and men play a major role. Unfortunately, we could not control for occupation or individuals' job characteristics to further distinguish between the work-related and other health determinants. Yet, the similarity of results for hospitalisations between low and high wage samples suggests that controlling for occupational variables might not significantly mitigate the observed gender gaps.

The larger odds of hospitalisation for women than for men may also reflect detrimental health impacts of caregiving (Gonçalves et al., 2021). The especially large RRR for Diseases of the Musculoskeletal System among the 50+ is consistent with this interpretation, as caregiving to older adults is prevalent among females 50-65 years old (i.e., daughters) and musculoskeletal disorders possibly result from heavy tasks like helping with bathing and transferring (Llamas-Ramos et al., 2023; Schulz & Eden, 2016). In Portugal, availability of (subsidised) formal long-term care for older adults is deficient, with family members like female children providing the bulk of support (Privalko et al., 2019). Such contextual aspects may explain the relatively large gender gap in sickness benefits in Portugal, compared to its European counterparts (Mastekaasa & Melsom, 2014). The analysis of hospitalisations likely underestimates the role of health for explaining the gender gap in sickness benefits, as it captured only severe manifestations of illness.

Our stratified analyses by wage level provide insights into the role of socioeconomic factors. We found larger odds/risk of sickness benefits (women versus men) in the low wage sample. This is consistent with several factors. First, the double work-caregiving burden is more acute among low socioeconomic status individuals, who cannot as easily afford formal support. This burden cumulates with the entire range of socioeconomic determinants of health that put poorer individuals, especially women, in a position of vulnerability. Second, caregiving to both children and aged parents (which may be behind some undue use of sickness benefits) contribute to inequalities in the labour market, including labour participation and pay (i.e., reverse causality from sickness benefits to wages, in our study; Angelov et al., 2016; Brito & Contreras, 2023). Third, the gender distribution across wage brackets typically shows a pronounced overrepresentation of women in the lower wage ranges (in part also due to discriminatory barriers, e.g., sticky floor hypothesis). If the only determinant of sickness benefits were health, this composition effect alone would result in a larger gender gap among low wage workers (as we have established above that health likely plays a significant role in explaining

gender differences in sickness benefits). Fourth, however, behavioural aspects, including undue use of sick leave for caregiving purposes, likely play a role too, especially for lower wage bands (Ziebarth, 2013). Fifth, the opportunity cost of taking sick leave is not uniform across the wage distribution. Sickness benefits are a flat percentage of wage; therefore, the absolute value of potential lost income becomes more significant as wage increases. This means that individuals in higher wage brackets, where men are overrepresented, may have incentives to avoid sick leave (i.e., presenteeism). Six, men may have access to discretionary benefits like employer-supported leave, making them less dependant on statutory sickness benefits than women, especially in higher-pay occupations.

Our analysis of hospitalisation diagnoses highlights the relevance of health problems affecting women of reproductive age —including severe ones that warrant hospitalisation. The RRR associated with “Other” — the absorbing category that included mainly diseases associated with the genital tract (both genders) and pregnancy— were extremely large, except in the 50+ sample. Across all our analyses, by limiting the sample to 50+ workers, we tried mainly to rule out sickness episodes related with health problems affecting reproductive age women (Magnusson et al., 2024). We did find much smaller odds/relative risk ratios in this sample, hinting at potentially large implications of reproductive issues for female health. Those results are also consistent with women taking more leave early on to prevent health complications, which may pay-off later in their (working) lives. However, those results may also be driven by selection out of the workforce for several reasons, different across genders, including, e.g., permanent disability/mortality from workplace accidents and caregiving responsibilities (Section 1).

Overall, our findings establish the significance of and the heterogeneity in the gender gap in sickness benefits. Our results also highlight the importance of health (related with both biological and occupational aspects), behavioural, socioeconomic, and institutional factors for explaining this gender gap. Moreover, these findings have several implications for policy and future research. First, to guide workplace policies for the enhancement of health and equity at work, we need to know more about the interplay between female and male biology and occupational/work drivers of health —e.g., how female and male health reacts to chemical, biomechanical, biological, and other occupational hazards, and to work-related stressors (Biswas et al., 2021; Casini et al., 2013; Mastekaasa & Melsom, 2014).

Second, reproductive health issues and specific chronic conditions, including those that do not require hospitalisation, that disproportionately affect women need special attention in the workplace too. For example, arthritis affects disproportionately (older) women and represents significant productivity losses, impacting not only individuals but firms as well (Sharif et al., 2017). Menstruation-related symptoms may also represent substantial productivity losses (Schoep et al., 2019). It is worth considering if policies such as menstrual leave, which already exists in Spain, might help reduce gender disparities in the labour market and improve female well-being (Widiss, 2023).¹²

Third, better monitoring of undue use of sick leave, which is likely to account for a portion of sickness benefits, could enhance fairness in the workplace and better or more transparent use of scarce social security resources. Yet, further investigations are needed, in Portugal and elsewhere, into the exact reasons for undue use. For example, caregiving responsibilities, especially towards aged parents and falling disproportionately on women, warrant enhanced availability of and access to formal long-term care, and potentially the development of a dedicated paid leave scheme (Heymann et al., 2022). In addition, and considering that the burden of care lays mostly on women, and especially poorer ones, improving the financial conditions of informal caregivers may also contribute to less undue sick leave.

Fourth, more family-friendly work arrangements, including flexible work hours, especially in industries/occupations with lower wages and where women are overrepresented, could help reduce (undue) use of sickness benefits and enhance female workers' wellbeing. Broader social and labour policies promoting equal and fair pay, and economic stability (i.e., permanent or open-ended employment contracts) could progressively allow more women—who so wish—to work part time and healthily combine work and family care. Relatedly, one topic deserving of attention in future research is the relationship between the gender gaps in sickness benefits and in pay, e.g., are the two positively correlated within occupations? Analysing this through the lens of within-couple wage differentials could offer especially valuable insights.

The limitations of this study were mostly data-related and included the omission of sickness spells shorter than the 3-day waiting period and the lack of occupational and

¹² On the one hand, menstrual leave could promote female health and wellbeing, reduce absenteeism and presenteeism, and promote workplace inclusivity and equal opportunities. On the other hand, such policies may backfire and contribute to the reinforcement of gender stereotypes, greater discrimination, and economic disadvantage for women.

other individual characteristics. We did not have information on diagnoses, except in the cases of hospitalisation, through a match with administrative data on admissions into National Health Service hospitals. Although very large, high-quality, and representative, our data covered only private sector wage workers.

6. Conclusion

Sickness benefits are an essential labour/social protection policy with positive spillovers for individual and public health. Indeed, despite their considerable costs, sickness benefits enable workers to stay at home when ill and avoid contagion; facilitate prompt treatment and promote recovery, preventing long-term illness and disability; and ultimately contribute to a healthier, more productive workforce and lower inequalities (Adams-Prassl et al., 2023; Heymann et al., 2020; Marie & Vall Castelló, 2023; Pichler, 2015; Slopen, 2023; Vander Weerd et al., 2023). Yet, other aspects besides health lead to under and overutilisation of sickness benefits, compared to a social optimum level of sick leave uptake. In this paper, we focused on the gender gap in sickness benefits. Our analysis was motivated by the existing gender gaps in pay, career opportunities, and access to disability benefits, which typically cannot be fully explained, suggesting some extent of discrimination (Blau & Kahn, 2017; Low & Pistaferrri, 2024).

This study contributed to quantifying and understanding the determinants of the gender gaps in sickness benefits. We explored its biological, behavioural, socioeconomic, occupational, and institutional drivers through different comparisons based on rich administrative data from Portugal. Beyond actual health differences between women and men, which seem to play a large role, the large gaps are consistent with two symmetric interpretations: overuse of sickness benefits by women and underuse by men. Given the Portuguese context, more women may unduly use sickness benefits to accommodate caregiving responsibilities, and more men may engage in presenteeism to provide for their family and follow perceived social norms. Nevertheless, other aspects like risk aversion, discriminatory barriers, and others are likely playing a part as well, and heterogeneity is important. Overall, the gender gaps in sickness benefits result from a complex mix of not only gender-related aspects, but also contextual/institutional factors that may be more policy-amenable.

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Figures and Tables

Figure 1. Conceptual framework: factors influencing greater sick leave uptake by men and women

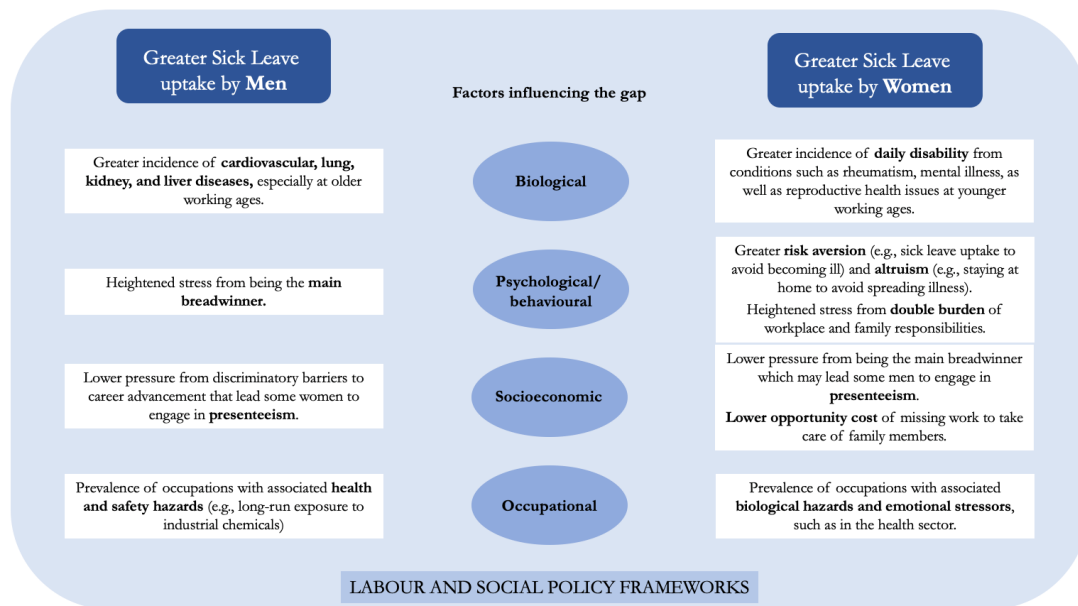


Table 1. Summary statistics

	Men	Women	All
Any sickness benefit	1.696%	2.787%	2.277%
Sickness benefit duration			
No benefits	98.304%	97.213%	97.723%
1-5 days	0.715%	1.094%	0.917%
6-10 days	0.639%	1.111%	0.890%
11+ days	0.341%	0.582%	0.469%
Any hospitalisation	0.139%	0.187%	0.165%
Diagnosis categories*			
No hospitalisation	99.860%	99.811%	99.834%
Diseases of the Nervous System	0.003%	0.005%	0.004%
Diseases of the Ear, Nose, Mouth, and Throat	0.010%	0.006%	0.008%
Diseases of the Respiratory System	0.003%	0.002%	0.002%
Diseases of the Circulatory System	0.006%	0.007%	0.007%
Diseases of the Digestive System	0.016%	0.008%	0.012%
Diseases of the Hepatobiliary System and Pancreas	0.005%	0.006%	0.006%
Diseases of the Musculoskeletal System and Connective Tissue	0.006%	0.006%	0.006%
Diseases of the Skin and Subcutaneous Tissue	0.004%	0.006%	0.005%
Endocrine, Nutritional and Metabolic Diseases	0.001%	0.005%	0.003%
Diseases of the Kidney and Urinary System	0.004%	0.003%	0.004%
Myeloproliferative and Poorly Differentiated Disorders	0.002%	0.003%	0.003%
Mental Disorders	0.001%	0.002%	0.001%
Other	0.008%	0.029%	0.019%
Unknown (unmatched)	0.069%	0.100%	0.086%
Type of admission*			
No hospitalisation	99.860%	99.811%	99.834%
Urgent admission	0.027%	0.028%	0.028%
Planned admission	0.044%	0.060%	0.052%
Unknown (unmatched)	0.069%	0.100%	0.086%
Age			
18-25	13.533%	12.738%	13.110%
26-35	34.741%	39.189%	37.108%
36-45	27.168%	27.292%	27.234%
46-55	17.531%	15.685%	16.549%
56-65	7.026%	5.096%	6.000%
Foreign	12.547%	11.625%	12.057%
Person-months	3,206,331	3,646,098	6,852,429

Notes: *Sample excludes January and February 2012.

Table 2. Associations between gender and sickness benefits

	All		Low wage	High wage	50+
	Unadjusted	Adjusted	Adjusted	Adjusted	Adjusted
A) Likelihood of sickness benefits (Odds ratios: women v. men)					
Any sickness benefit	1.673*** (0.016)	1.662*** (0.016)	1.551*** (0.019)	1.430*** (0.021)	1.383*** (0.039)
Pseudo R-squared	0.012	0.006	0.012	0.016	0.008
C) Duration of sickness benefits (Relative risk ratios: women v. men)					
Reference: no benefits					
1-5 days	1.547*** (0.021)	1.542*** (0.021)	1.421*** (0.024)	1.332*** (0.028)	1.325*** (0.060)
6-10 days	1.758*** (0.021)	1.775*** (0.021)	1.618*** (0.024)	1.557*** (0.030)	1.441*** (0.052)
11+ days	1.723*** (0.024)	1.756*** (0.024)	1.714*** (0.031)	1.399*** (0.032)	1.360*** (0.055)
Pseudo R-squared	0.005	0.012	0.012	0.015	0.009
Person-months	6,852,429	6,852,429	3,326,102	3,336,431	494,963

Notes: Adjusted models controlled for age (18-25,26-35,36-45,46-55,56-65), nationality (Portuguese or foreign), and time fixed effects. Any sickness benefit included those initiated by a hospitalisation episode. Low and high wage subsamples don't add up to the total number of observations because the bottom and top 1% salaries were excluded and there were some missing values. *p<0.1, **p<0.05, ***p<0.01. Standard errors in parentheses adjusted for individual clustering.

Table 3. Associations between gender and hospitalisation

	All Unadjusted	Low wage Adjusted	High wage Adjusted	50+ Adjusted
A) Likelihood of hospitalisation (Odds ratios: women v. men)				
Any hospitalisation	1.342*** (0.030)	1.372*** (0.031)	1.293*** (0.039)	1.288*** (0.045)
Pseudo R-squared	0.001	0.010	0.010	0.016
Person-months	6,852,429	6,852,429	3,326,102	3,336,431
B) Diagnosis related group (Relative risk ratios: women v. men)				
Reference: no hospitalisation				
Diseases of the Nervous System	1.527*** (0.206)	1.600*** (0.218)	1.887*** (0.356)	0.929 (0.200)
Diseases of the Ear, Nose, Mouth, and Throat	0.639*** (0.057)	0.640*** (0.057)	0.665*** (0.076)	0.503*** (0.078)
Diseases of the Respiratory System	0.571*** (0.101)	0.585*** (0.104)	0.450*** (0.105)	0.620* (0.176)
Diseases of the Circulatory System	1.067 (0.104)	1.116 (0.109)	1.141 (0.147)	0.785 (0.130)
Diseases of the Digestive System	0.482*** (0.038)	0.492*** (0.039)	0.456*** (0.045)	0.420*** (0.060)
Diseases of the Hepatobiliary System and Pancreas	1.220* (0.146)	1.264* (0.153)	1.330* (0.216)	0.883 (0.170)
Diseases of the Musculoskeletal System and Connective Tissue	0.899 (0.094)	0.927 (0.098)	0.967 (0.128)	0.481*** (0.095)
Diseases of the Skin and Subcutaneous Tissue	1.534*** (0.176)	1.540*** (0.179)	1.534*** (0.228)	1.245 (0.234)
Endocrine, Nutritional and Metabolic Diseases	3.402*** (0.625)	3.436*** (0.629)	3.960*** (1.010)	2.416*** (0.695)
Diseases of the Kidney and Urinary System	0.926 (0.144)	0.948 (0.147)	1.066 (0.217)	0.633* (0.152)
Myeloproliferative and Poorly Differentiated Disorders	1.552*** (0.242)	1.670*** (0.261)	1.589** (0.353)	1.404 (0.315)
Mental Disorders	1.217 (0.267)	1.235 (0.276)	1.239 (0.334)	0.872 (0.339)
Other	3.836*** (0.283)	3.824*** (0.281)	3.332*** (0.324)	3.863*** (0.457)

Unknown (unmatched)	1.448*** (0.045)	1.482*** (0.046)	1.399*** (0.058)	1.368*** (0.065)	1.091 (0.100)
Pseudo R-squared	0.004	0.013	0.004	0.004	0.002
Person-months	6,711,365	6,711,365	3,257,024	3,267,351	482,813
B) Type of admission (Relative risk ratios: women v. men)					
Reference: no hospitalisation					
Urgent	1.034 (0.052)	1.041 (0.052)	0.990 (0.065)	0.921 (0.078)	0.684** (0.117)
Planned	1.381*** (0.051)	1.417*** (0.052)	1.414*** (0.069)	1.058 (0.063)	1.270** (0.131)
Unknown (unmatched)	1.448*** (0.045)	1.482*** (0.046)	1.399*** (0.058)	1.368*** (0.065)	1.091 (0.100)
Pseudo R-squared	0.001	0.009	0.001	0.001	0.001
Person-months	6,711,365	6,711,365	3,257,024	3,267,351	482,813

Notes: Adjusted models controlled for age (18-25,26-35,36-45,46-55,56-65), nationality (Portuguese or foreign), and time fixed effects. For diagnoses, the last three columns report results for unadjusted models, on account of the complexity of estimating multinomial models with many categories and few observations in many of them. Observation window for diagnoses and type of admission stops at the end of 2011. Low and high wage subsamples don't add up to the total number of observations because the bottom and top 1% salaries were excluded and there were some missing values. *p<0.1, **p<0.05, ***p<0.01. Standard errors in parentheses adjusted for individual clustering.