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ABSTRACT

The Growth of Disability Insurance in Belgium: Determinants and Policy Implications*

Between 2005 and 2020, Belgium experienced a significant rise in the recipiency rate of long-term disability insurance (DI), rising from 3.5% to 6.8%. In this paper, we examine the potential factors driving this increase by exploiting administrative micro-level data covering the Belgian population from 2005 to 2015. Our analysis reveals that changes in observable characteristics, such as age, labor market participation among some groups of workers, and several job characteristics, can only marginally account for the increase in the long-term DI entry rate between 2005 and 2015. We also find evidence suggesting that reforms in unemployment insurance over the past two decades have contributed to the rise in the DI entry rate from unemployment. Finally, drawing on the literature on optimal DI policy, we discuss potential reforms aimed at decreasing the Belgian DI recipiency rate.

JEL Classification: H53, H55, J65

Keywords: social insurance, disability insurance, unemployment insurance

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1. Introduction

Disability insurance (DI) has been a crucial safety net for workers facing health shocks that impair their ability to work beyond a certain threshold. Since the end of the 1970s, many countries, including Belgium, have witnessed significant rises in DI expenditures, prompting policymakers to consider and implement various reforms (Low and Pistaferri 2020, Despehande and Lockwood 2022, Garcia Mandico et al. 2022). In Belgium, the rise in the DI recipiency rate has recently become a pressing concern, as shown in Figure 1, which compares the country's DI recipiency rate (i.e., the number of DI recipients relative to the population aged 20–64) with other countries that have experienced high DI recipiency rates in the past. While some countries have stabilized or seen declines, Belgium's rate has sharply increased from 3.5% to 6.8% between 2005 and 2020,[1] and the trend continues to rise.

The causes of fluctuations in DI recipiency rates have been the subject of a vast literature, and much progress has been made in understanding this phenomenon. It is now widely acknowledged that DI recipiency rates arise from a complex interplay between the proportion of the insured population, health conditions, economic incentives, and DI eligibility and screening rules (Low and Pistaferri 2015). Some studies have focused on certain explanatory factors in isolation, while others have taken a holistic approach to encompass these factors together and gauge their relative significance.[2] Despite this growing body of research, only a limited number of studies have provided a cohesive framework to unravel the various factors contributing to the rise of the DI recipiency rate in Belgium.

In this paper, we aim to address this gap by examining the role of various explanatory factors in the increase of Belgium's DI recipiency rate. Our analysis begins with a detailed examination of the evolution of the DI recipiency rate between 2005 and 2020. We find strong disparities in DI recipiency rates based on labor market status and job characteristics. Notably, in 2015 the highest DI recipiency rates are observed among unemployment insurance (UI) recipients (20.2%); salaried workers in health (8.2%), construction (8.6%), and administrative and support service (7.5%) sectors; and salaried workers in the bottom of the wage distribution

[1] These rates refer to the long-term DI recipiency rate, i.e., the share of the population aged 20–64 residing in Belgium that is observed on long-term DI (i.e., DI spells lasting more than one year) in December 31 of each year.

[2] See Autor and Duggan (2003, 2006), Duggan and Imberman (2009), and Liebman (2015) for the US; Koning and Lindeboom (2015) for the Netherlands; Banks et al. (2015) for the UK; and Burkhauser et al. (2014) for Australia, the UK, Netherlands, Sweden, and the US.

(7.6% in the lowest wage quartile). Analyzing geographical disparities in DI rates across the provinces, we find a strong negative correlation between changes in local DI and UI rates for individuals aged 20 to 54, supporting the hypothesis that the increase in DI rates might be partially attributable to substitution between UI and DI programs.

We then use administrative micro-level data on the population aged 20–64 and residing in Belgium to study the factors contributing to the increase in the long-term DI (LT DI) entry rate (i.e., the biannual rate of entry into LT DI). Specifically, we employ a modified Blinder-Oaxaca decomposition for binary variables, developed by Fairlie (2005), to explain the rise in the LT DI entry rate between 2005 and 2015, a period marked by a significant increase in the DI recipiency rate. We find that changes in household composition and an interaction between age, gender, and labor market status can explain only 5.5% of the increase in the LT DI entry rate during the studied period. Moreover, from our regressions, we also find that the increase in the LT DI entry rate is largest among individuals on regular UI, especially since 2012. For salaried workers, we find that demographic and basic job characteristics (i.e., NACE one-digit sector, blue-/white-collar contract, firm size, working hours, and daily salary) can explain 43.1% of the observed increase in the LT DI entry rate for men and 24.0% for women.

Our paper also offers useful guidelines for policymakers. Despite population aging and increased labor market participation of older workers, our analysis reveals that these factors have not been the primary drivers of the increase in the DI recipiency rate. A review from a vast economic literature suggests that economic incentives for workers and firms, along with factors such as poor worker health and DI rules, play a pivotal role in the fluctuations in DI recipiency rates. Based on these findings, we discuss various approaches to reduce the number of DI recipients, carefully weighing the pros and cons of each strategy. Specifically, we emphasize the potential effectiveness of policies promoting reintegration efforts by workers and employers during the DI spell, as well as the potential effectiveness of greater financial responsibility on the part of employers in funding DI transfers. Additionally, we highlight the importance of considering the substitution effects between UI and DI, which implies that reforms in UI can have significant spillover effects on the DI program. Consequently, narrowing the gap between UI and DI benefits and improving labor market opportunities for individuals on the verge of exiting the labor market could help mitigate individuals' incentives to claim DI benefits.

The paper proceeds as follows. Section 2 provides a description of the Belgian DI program, together with a brief description of the other main social insurance programs. Section 3 provides an in-depth literature survey on the causes of the growth in DI recipiency rates in several OECD countries, focusing on Belgian studies in a separate sub-section. Section 4 provides several insights about the evolution of the Belgian DI recipiency rate. Section 5 describes our main empirical analysis and the dataset, and Section 6 presents the results. Section 7 discusses the recent reforms in the Belgian DI program within the context of the existing literature on optimal DI policy and provides some guidelines for policymakers. Section 8 concludes.

2. Legislative Framework

2.1. The Belgian DI Program

In Belgium, salaried workers, the self-employed, and civil servants are, under some conditions, insured against the risk of a health deterioration affecting their ability to work, with each category subject to a distinct regime. Among salaried workers, sickness absences are covered by two public insurances: one for work injuries and work-related illnesses, managed by the Federal Agency for Occupational Risks, and another for incapacity and disability, managed by the National Insurance for Health and Disability (NIHDI), which also covers the medical expenses of any person residing in Belgium.[3] Self-employed workers are covered by one single public insurance managed by the NIHDI, which provides income replacement benefits for work interruptions due to both occupational and non-occupational illnesses. Civil servants benefit from a specific sickness and disability scheme with rules that are very different from those of the other two. To keep our study tractable, we focus on the DI program for salaried and self-employed workers, excluding occupational diseases and work accidents from our analysis.[4] In this section, we describe the program's main characteristics and explain how these

[3] The current system of DI benefits and medical coverage is organized by the compulsory health care insurance and benefits law, coordinated on July 14, 1994.

[4] The choice of excluding occupational illnesses in the salaried scheme from our analysis is grounded on the fact that the share of salaried workers receiving benefits for work injuries or occupational illnesses represents a tiny proportion among sickness absences. In December 31, 2020, 0.35% of the population aged 20–64 was receiving transfers for either an occupational disease or a work accident (CBSS Datawarehouse online). This low rate is mainly because the criteria for recognizing occupational illnesses are quite strict. A worker's illness must belong to a list of illnesses specific to their profession, and they need to provide proof of a causal relationship between the illness and exposure to the occupational risk.

characteristics compare with those of other OECD countries' programs and provide a historical perspective on return-to-work policies in Belgium.

2.1.1. Program Characteristics

Eligibility conditions and DI screening. Sickness absences are divided into three periods: "guaranteed salary" (1–30 absence days), "primary incapacity" (30 days to one year of absence), and "invalidity" (more than one year of absence). To facilitate international comparisons, we adopt a more standard denomination, distinguishing these periods as sick leave, short-term disability (ST DI), and LT DI, respectively.

The DI program is a contributory scheme, and therefore workers must satisfy some minimum work history requirements to be insured.[5] Insured workers (regardless of their labor market status) must meet three conditions for their DI claim to be accepted.[6] First, they must have ceased all professional activities at the time of application. Second, this cessation must be directly due to the occurrence, or worsening, of a health impairment. Third, the health impairment must reduce their ability to work (called "gainful ability") by at least 66% compared to another worker with similar work experience and education.[7]

The DI screening process is completed at different levels depending on the duration of the absence spell. For salaried workers,[8] the general practitioner (or any other recognized medical expert) certifies the sickness absence during the sick leave period. After this period, the worker must apply to their health insurance fund[9] to receive DI benefits, which requires a general practitioner (or another licensed medical expert) to complete a document for the

[5] For employed and unemployed workers, the condition is to have worked (or have been unemployed) at least 180 days over the last 12 months (800 hours over the last 12 months for part-time jobs). For self-employed workers, the condition is to have paid social contributions for at least two quarters over the last 12 months (source: NIHDI). The ultimate fallback option for individuals who do not comply with these requirements is to claim means-tested social assistance benefits.

[6] Article 100, § 1, of the coordinated law of July 14, 1994.

[7] During the first six months of disability, the work capacity is assessed only in relation to the job performed by the worker (if they are not unemployed). From the seventh month of incapacity, the gainful capacity is assessed by considering any job that the individual could perform given their skills and professional experience (without there being any possibility of a social downgrading). However, since there is no discontinuity in the exit rate from DI at the seventh month of disability, it is likely that this change does not significantly increase the rejection rates from the insurance program, at least in a short time horizon.

[8] In contrast, UI recipients enter DI from the first day of sickness absence. For self-employed workers, periods of sickness absence from work lasting less than eight days are not compensated. Periods of sickness absence lasting more than seven days are compensated from the first day by the NIHDI.

[9] In Belgium, health insurance funds ("mutualités" or "Mutualiteit" in French and Dutch, respectively) play the role of intermediaries between the NIHDI and the population. These health insurance funds are responsible for supporting, informing, and advocating for their members. They have been inherited from the strong influence of corporations and labor unions in the Belgian political scene over the 20th century. The choice of the health insurance fund (Christian, socialist, neutral, free, or liberal) is free and often influenced by individuals' political/religious inclinations.

worker to submit to their health insurance fund. Based on these pieces of information and, if deemed necessary, a personal examination, the health insurance fund's advisory doctor determines whether the worker is eligible for DI benefits.[10] At the end of the first year of absence, the advisory doctor must submit a form to the NIHDI medical board to prolong the DI spell, where the latter can decide to accept or reject the LT DI claim or carry out its own assessment.

DI benefits calculation. The amount of DI replacement benefits that a worker can receive depends on several parameters, including the worker's regime (salaried or self-employed), occupation (blue collar, white collar, or unemployed), previous earnings, and household status (single-person, single-income and dual-income[11]). Appendix **Error! Reference source not found.** describes the rules used to calculate these benefits in more detail. To summarize, replacement benefits amount to a fraction of the last gross salary in the salaried regime and a lump sum payment in the self-employed regime. In the salaried scheme, during the ST DI period, benefits are equal to 60% of the last gross salary for white- and blue-collar workers (framed by caps and floors whose levels depend on the household type), while for unemployed workers, they are computed as the minimum value between unemployment benefits and 60% of the last gross salary. During the LT DI period, replacement rates vary according to household type, with 65% for single income households, 55% for single person households, and 40% for dual income households (with caps and floors in each category). Also note that DI periods are considered when calculating pensions, based on the average salary for the year preceding entry into DI.

Reassessments, part-time work, and work rehabilitation. Once individuals are admitted into DI, reassessment dates are decided by the health insurance fund's advisory doctor, based on the medical information at their disposition. Additionally, if the LT DI recipient returns to work for a period of less than three months (or 14 days for ST DI periods) and falls ill again, the previous disability period is automatically extended under the same conditions as when it ended.

[10] After seven months of absence, the NIHDI medical board can also end the DI spell.
[11] In Belgium, these household types are commonly referred as "head of household", "cohabitant" and "isolated" household.

2.2.2. Historical Perspective on Return-to-Work Policies

While the calculation of DI benefits, DI eligibility rules, and DI screening have remained mostly unchanged over the last 15 years, the Belgian federal government has increasingly prioritized return-to-work (RTW) policies.[12] This has been pursued through various means, which can be summarized as follows: (1) increasing incentives for part-time work during the benefit period, (2) working closer with regional public employment services to provide vocational training and job search assistance programs for DI recipients, (3) clarifying the role of stakeholders involved in the RTW process and (4) standardizing the different stages of the RTW process.

Since 1996,[13] DI recipients have been able to work part time while receiving partial benefits, which requires a request to be sent to the health insurance fund's advisory doctor.[14] This option was underused until more recent years when the government gradually increased financial incentives in 2006, 2013, and 2018[15] and implemented reforms to ease the administrative procedure for DI recipients to start part-time supported work.[16] As a result, the share of LT DI recipients who were working on a part-time basis increased from 6.8% to 13.0% between 2009 and 2021 (NIHDI).

Since 2009, the NIHDI and regional employment services have been collaborating more closely to offer vocational training and job search assistance programs to DI recipients. Participation in these programs, however, requires the explicit agreement of the DI recipient, and no sanction can be imposed if they refuse or withdraw from the program. To increase the participation rate in these programs, financial incentives were introduced, such as offering lump sum bonuses of €250 in 2009, which were later increased to €500 in 2012, for those completing a vocational rehabilitation program.

[12] See De Greef and Deroubaix (2018) for an in-depth juridical analysis of the legislative changes implemented in the DI program since the early 2000s (in French).

[13] Royal decree of July 3, 1996, which implemented the compulsory health care insurance and benefits law that was coordinated on July 14, 1994.

[14] This request can be made starting from the first day of primary incapacity provided that the worker has completely stopped all professional activities. The conditions include the person's medical condition showing a reduction of 50% in their capabilities and the work being adapted to their current state of health. The health insurance fund's advisory doctor evaluates the request and can eventually decide on the volume of hours worked or other aspects of the exerted work.

[15] Since 2018, benefits reduction is computed on the following basis. If the person works less than 20% of a full-time equivalent (FTE), benefits are not reduced. Above this threshold, they are reduced according to the percentage of work exceeding 20%. For instance, for an individual whose daily benefits are initially equal to $€40$ per day and who want to work on a 50% FTE, the benefits will be reduced by $(50\% - 20\%) \times 40 = €12$ per day (source: NIHDI).

[16] In this respect, since 2013, the worker can resume part time to their employer without waiting for the advisory doctor's authorization, provided that the request has been sent no later than the first day before they return to work (Royal decree of March 12, 2013 that established the effective date of articles 16 to 18 of the program law, coordinated on July 4, 2011).

Furthermore, since 2009, the health insurance fund's advisory doctor has been responsible for overseeing the work rehabilitation process of DI claimants.[17] This includes assessing the remaining work capacities of the DI recipient, and eventually submitting a work rehabilitation plan for them. De Greef and Deroubaix (2018) note that this reform introduced a new perspective on disability, recognizing that many DI recipients possess remaining work capacities that could be activated with suitable measures. In practice, however, the implementation of the rehabilitation plan was left to the discretion of the health insurance fund's advisory doctor until 2016.

In 2016–2017, a more systematic RTW plan was designed and gradually implemented for all new DI spells. Although an extensive description of this reform is beyond the scope of this paper, we can summarize its key features as follows. First, the reform specifies a calendar of actions to the advisory doctor, to evaluate the remaining work capacities, as well as a standardized classification method.[18] Second, for those who are deemed able to return to work (or to return to the labor market) with a rehabilitation or a training program, the doctor establishes and proposes a plan containing a calendar of actions to the DI recipient. If the recipient has no labor contract, the doctor submits a rehabilitation plan for them, which may include contacts with regional public employment services and participation in one or several vocational training programs. If the DI recipient is still bound by a labor contract, the doctor transfers the responsibility to the employer's occupational doctor, who must invite the recipient to a medical assessment and examine the workplace to estimate the possibility for resuming to work (e.g., working in a new occupation, adapting to the work environment, reducing the number of hours worked or following a job training program).

At the end of the assessment, the occupational doctor decides whether or not the DI recipient can resume working. If approved, the employer is requested to draw a reintegration plan with a calendar of actions. However, if the occupational doctor or the employer deem it unfeasible to reintegrate the worker (or the worker declines the plan proposed by the employer), the

[17] Royal decree amending, with regard to vocational rehabilitation, the royal decree of July 3, 1996 that implemented the compulsory health care and benefits insurance law, coordinated on July 14, 1994.

[18] More precisely, after four months of sickness absence, the health insurance fund's advisory doctor assesses the individual's remaining work capacities. At the end of the examination, the doctor classifies the worker into one of the four following categories: (1) can spontaneously return to work (or to the regular labor market if the worker has no labor contract), at the latest at the end of the sixth month of incapacity; (2) is definitively inapt to work and cannot return to work nor to the regular labor market; (3) cannot return to work (or to the regular labor) at the moment because they must be treated first; and (4) can return to work (or to the regular labor market) after rehabilitation or vocational training.

labor contract may be terminated due to medical force majeure, without any severance pay for the worker.

The 2016–2017 reform has become controversial since it was implemented, primarily due to the ease with which employers can terminate the labor contract with a medical force majeure after completing the plan. According to De Greef and Deroubaix (2018, p. 393), "permanent incapacities are (…) easy to ascertain without any attempt to adapt the work being proposed by the occupational doctor (…)." Moreover, Boets et al. (2020) find that more than half of RTW plans resulted in contract terminations. While these criticisms cast doubt about the reform's effectiveness in securing work relationships and fostering work rehabilitation at the same employer, it is uncertain whether terminating the contract after a failed RTW plan adversely affects the future employment prospects of DI recipients. One possibility is that it may create employment opportunities at new firms while securing the receipt of DI benefits, which would not be possible if the worker had to resign. However, there is currently, to our knowledge, no causal evidence about the long-term employment effects of this reform.

Since 2022, some changes have been made to this RTW plan.[19] First, to address the work overload of advisory doctors due to the increase in DI recipients, additional resources have been allocated to the health insurance funds to hire RTW coordinators. Their role consists of establishing face-to-face contact with DI recipients and coordinating the actions of the different stakeholders involved in the RTW process. Second, in response to the criticism regarding the misuses of layoffs with a medical force majeure justification, measures have been implemented to separate this procedure from the RTW plan. This separation aims to eliminate to the quasi-automatic layoff procedure in case the plan fails.

Third, DI beneficiaries have become obliged to provide all information necessary for the assessment of their remaining capacities and to attend the medical examination (or the meeting organized with the RTW coordinator) to assess their remaining work capacities. If they do not comply with these requirements, a sanction may be imposed, i.e., a benefit cut of 2.5% until they comply.[20] Fourth, a recent reform has introduced a financial incentive for

[19] See the law of December 12, 2021, which introduced the "Return to Work Plan" coordinated by the "Return to Work Coordinator" in DI for salaried workers.

[20] Royal decree of December 11, 2022, which amended the Royal decree of July 3, 1996 that implemented the compulsory health care insurance and benefits law, coordinated on July 14, 1994.

employers to reduce excessive flows of LT DI entry among their workers.[21] This incentive takes the form of an increase in employers' social contributions by 0.625 percentage points (pp) (i.e., a 2.5% proportional increase) for private firms employing more than 50 workers, whose average inflow rate into DI over the last four quarters is two times higher than the NACE four-digit sector average and three times higher than the private sector average.

2.2.3. Comparison of the Belgian DI Program with OECD Countries

International perspective. To put the Belgian DI program into perspective, we describe how it compares with other OECD countries in the following dimensions: eligibility conditions, DI screening, benefits calculation, and employers' financial incentive. Eligibility conditions for disability benefits have been a subject of controversy in many countries, particularly in how the degree of reduction in ability is defined and measured. In Belgium, doctors are in principle required to consider any profession that the DI claimant could potentially undertake based on their education and experience, without taking into account the actual employment opportunities available in the labor market (Hove 2015). However, in practice the assessment of remaining work opportunities often depends on the advisory doctor's judgment, which can be delicate as many doctors lack sufficient knowledge about the labor market to estimate feasible job options for individuals (De Greef 2021).

By contrast, in Norway, doctors are explicitly instructed to only consider realistic work opportunities when assessing a DI claimant's remaining work capacities (Andersen et al. 2019). In the Netherlands, DI claims are evaluated based on the concept of earnings capacity, which measures the fraction of previous earnings that a claimant can earn in the labor market given their functional limitations (De Jong et al. 2011). Some countries, such as Austria and the US, have relaxed eligibility conditions after a certain age threshold, blurring the boundary between disability and early retirement (Staubli 2011).

Furthermore, there are variations among countries regarding past contributions and the types of health impairments covered by DI. For instance, in the Netherlands, all workers are insured against income losses resulting from both occupational and non-occupational health

[21] Royal decree of December 19, 2022, issued in the execution of Article 145 of the Program Law of December 27, 2021.

impairment, without any requirements related to past work history. This aspect is often cited to explain the high DI recipiency rate in this country (Koning and Lindeboom 2015).

Regarding DI screening rules, most countries have systems in which DI claims are certified by personal physicians and are then examined by doctors from the DI institution. However, while the former goal of DI screening was to assess the degree of workers' lost capacities, it has increasingly become a way to assess the degree of residual capacities and, in this respect, has become an integral part of the RTW process. For instance, in Norway, participation in vocational rehabilitation is mandatory at a certain stage of the DI spell, playing the role of an additional screening device to assess individuals' residual capacities (Markussen and Røed 2014). In the Netherlands, DI screening essentially refers to verifying whether workers' and employers' reintegration efforts during the first two years of sickness absence have been sufficient. This process, called the Gatekeeper Protocol, was implemented in 2002. An interesting aspect of this program is that by accounting for both employers' and workers' reintegration efforts, the protocol explicitly recognizes that employers must be made responsible for preventing their workers from entering DI. We further discuss this point in Section 7.1.

Benefits calculation is another important area of difference across countries. Some countries have graded DI sickness/DI programs, i.e., programs that replace earnings according to the degree of lost ability to work. For instance, in the Netherlands, full DI benefits are paid to individuals whose loss in earnings ability is above 80%, while partial DI benefits are paid to those with a loss in earnings ability between 35% and 79% (Prinz et al. 2021).[22] In addition, each system computes DI benefits according to different criteria and with a different degree of generosity. For instance, in Norway and the Netherlands, the replacement rate amounts to 100% of workers' previous earnings during the first year. These benefits are then, respectively, equal to 66% and 70%[23] in each country for fully disabled individuals. In Austria, DI benefits are computed based on the person's age and number of contribution years (Haller et al. 2023).

[22] For employed and partially disabled individuals, the system also provides wage subsidies, while for unemployed and partially disabled workers, these benefits are supplemented by unemployment benefits (Konings and Lindeboom 2015).

[23] In the Netherlands, a specific scheme was drawn in 2006 for those deemed fully and permanently disabled (Konings and Lindeboom 2015). This scheme provides a replacement ratio of 75% of previous earnings and excludes rehabilitation programs. However, access is very strict and constitutes less than 10% of DI recipients.

Finally, countries largely differ in the degree of financial incentives provided to employers to reintegrate their workers in the firm. For instance, in the Netherlands, employers have been financially responsible for paying sickness benefits to their employees during the first two years of absence since 2004, while the DI program (i.e., for absences due to illness lasting more than two years) has been subject to experience rating since 1998. This means that employers' social contributions to DI are based on the amount of DI benefits paid in the past to their employees.[24]

2.2. Other Social Insurance Programs

To better understand the question of substitution effects between DI and other social insurance programs in Belgium, we provide a brief overview of these programs: regular unemployment, old-age unemployment and unemployment with company supplement (UCS), old-age pension, and time credit. We also provide a historical account of the key legislative changes within each program.

Regular unemployment. In Belgium, UI benefits are computed at the federal level by the federal employment agency,[25] while activation policies, intermediation services, and sanctions[26] are overseen by regional public employment services.[27] There are two pathways to eligibility for UI benefits. First, young labor market entrants without prior job experience become eligible after a one-year waiting period. In this case, the replacement benefits amounts to a monthly lump sum, which varies based on household composition. Second, laid-off workers can claim UI benefits if they meet minimum past contribution requirements, equivalent to one year of worked or assimilated days at the time of claim submission.

A unique feature of the Belgian UI program is that UI benefits are not limited in time[28] and are instead computed as a share of the last income and decrease gradually over time. The replacement rate is equal to 65% of the last income during the first three months and is equal to 60% between three months and one year.[29] After one year, the replacement rate depends

[24] See De Groot and Koning (2016) for a more precise description of experience rating in the Netherlands.
[25] ONEM in French or RVA in Dutch.
[26] Job search requirements and sanctions were formerly under the responsibility of federal employment agency and have been delegated to regional employment agencies following the sixth state reform, in 2014.
[27] There are three regional employment services (one for each region): Actiris in Brussels, Forem in Wallonia, and VDAB in Flanders.
[28] Note, however, that during the 80s and 90s, many exclusions from UI were applied to UI recipients with a dual income household status, specifically targeting those with "abnormal" unemployment durations, which were defined as unemployment durations longer than 1.5 the mean UI duration in the same district (Lefebve 2019).
[29] The upper limit for UI benefits also decreases after six months of unemployment.

on the household composition: 60% for single income households, 55% for single person households, and 40% for dual income households. Between one and four years of unemployment, the amount of benefits decrease gradually depending on age and past contribution years,[30] and they reach a floor after a maximum of four years. In Appendix Table A. 2, we illustrate the potential financial incentives to switch from LT UI to LT DI, by displaying the value of LT UI benefits and LT DI benefits after UI benefits have reached their floor level. LT DI benefits are much more financially attractive than LT UI benefits, particularly for dual income households.

Since its establishment after the second World War, the UI program has undergone numerous reforms.[31] While a comprehensive overview of these reforms is beyond the scope of this study, we can summarize the most significant ones since the early 2000s as follows. First, an important reform was passed in 2004,[32] imposing job search requirements and monitoring for UI recipients after 15 months of unemployment.[33] This reform became very controversial as it marked the first instance of monitoring job search activities among the unemployed population. Second, two important reforms were passed in 2012.[34] The first reform accelerated the reduction of UI benefits over time[35] and adjusted the fictive salary used to calculate pension amounts during long-term unemployment periods.[36] The second reform imposed a time limit of three years on UI entitlement for young job market entrants.[37] Additionally, it relaxed the criteria defining a suitable job offer while also postponing the minimum age at which UI benefits increase (by approximately € 50/month) from 50 to 55

[30] Replacement benefits remain fixed after age 55 or 25 contribution years.
[31] See Dumont (2012) and Lefebve (2019) for historical perspectives of the Belgian UI program (in French).
[32] Royal decree of July 04, 2004.
[33] See De Brouwer et al. (2023) for more detailed information on this program. While this measure only targeted unemployed workers below the age of 50, it was gradually extended to workers aged between 50 and 54 in 2013 and 54 and 60 in 2015. The reform also increased financial resources for the regional public employment services to propose active labor market policies, and implemented more systematic information exchanges with the federal employment agency, raising the risk of a sanction in case of refusal to collaborate with the caseworkers of the regional employment services.
[34] See Lefebve (2019) for a detailed description of these reforms.
[35] Royal decree of July 23, 2012 that amended the royal decree of November 25, 1991. In short, before 2012, the replacement rates amounted to 60% during the first year of unemployment and 60%, 54%, and 40% (with caps and floors) for single income households, single person households, and dual income households after then, respectively. Then new computation rules (which are still prevalent today) caused UI benefits to decrease more rapidly after the first year of unemployment, depending on the individual's age, household type, and number of contribution years.
[36] Law of December 28, 2011 concerning various provisions.
[37] Royal decree of December 28, 2011.

(Lefebve 2019). Finally, in 2015 further restrictions were imposed on the eligibility rules for UI benefits among young labor market entrants.[38]

Old-age unemployment and UCS. From the late 70s to the early 90s, the country was hit by a sharp increase in the unemployment rate due to the oil shocks of the 1970s and the transition to a service-based economy. To address this, the Belgian government introduced early retirement plans to encourage the departure of older unemployed workers. As a result, a "conventional early retirement program," renamed "unemployment with company supplement" (UCS) in 2012, and an "old-age unemployment" program were set up, respectively, in 1974 and 1985.

The UCS program provides a combination of UI benefits plus a monthly severance payment paid by the former employer. Replacement benefits under this scheme are around 70% of the last salary, and the worker is exempt from all obligations normally imposed on UI recipients. The old-age unemployment program simply exempts older unemployed workers from all obligations normally imposed on UI recipients. Replacement benefits in this program are identical to the replacement benefits in the regular unemployment program, with a small bonus for old age. The two schemes have often served as substitutes for each other. When a worker was laid off before being eligible for the UCS program, it was common practice to negotiate a monthly severance payment with the employer, which would add up to the old-age unemployment benefits. Such informal—yet legal—arrangements were called "Canada-dry pre-pensions."

From the moment they were introduced, these programs quickly became very popular among workers and employers, accounting for 6% of the working-age population in 2005 (Sneesens and Van der Linden 2005). However, in the late 1990s and early 2000s, this popularity became a major concern for governments, which recognized that these programs created significant work disincentives for older workers. With an employment rate of only 25% in 2001 among workers aged 55–64, Belgium had one of the lowest employment rates in the EU. The need for reforms was also spurred by the European political context at the end of the 1990s. In particular, the inception of the European Employment Strategy and the Open Method of

[38] In short, before 2015, an individual had to be under the age of 30 when they applied. Benefits were granted after a waiting period of one year, provided the individual had provided sufficient evidence of job-seeking activities. Since 2015, benefits are only granted if the jobseeker is under the age of 25 at the end of the waiting period. Stricter conditions have also been imposed on school leavers under the age of 21. For this group, the new rules require the leaver to have obtained a high school diploma.

Coordination in 1997 introduced a policy agenda and a series of economic targets to be shared among member states.

Regarding the UCS program, several reforms implemented between 2002 and 2015 have tightened access to this program and reduced its attractiveness to workers and employers.[39] These reforms mainly involved increasing the minimum eligibility age (or required years of contribution) for the program, increasing the rate of social contributions imposed on the company supplements, reducing the financial attractiveness of the scheme for workers in terms of calculating pension benefits, and tightening the rules to be exempted from remaining active in the labor market.[40]

As for the old-age unemployment program, several reforms gradually increased the eligibility age to the program and reduced its financial attractiveness in terms of how pension benefits were calculated. In 2002, the eligibility age was raised from 50 to 58 years old[41] and further increased to 60 in 2012. Then, in 2015 the program was substantially remastered after the federal government created a new status of "adapted" availability for unemployed workers aged 60–65, imposing a series of obligations (e.g., accepting any suitable job offer) without needing to search actively for a job.[42]

Old-age pension. Although the legal pension age is currently set at age 65,[43] old-age pension is already available to salaried workers between age 60 and 65, depending on accumulated contribution years.[44] For each career year, the pension is calculated with the following formula: $\frac{S\,(1+r)}{45} \times \mathrm{k}$, where S corresponds to total earnings, r is a price re-evaluation index, and k is the replacement rate equal to 60% for dual income households households and 75% for single income or single person households. The conditions to enter the old-age pension before the normal age were gradually tightened in 2012 and 2015. While workers could enter old-age pension at age 60 with 30 contribution years before 2012, this minimum age was

[39] See Claes (2012) for more details on these reforms (in French).
[40] See Fraikin et al. (2021) for a precise timeline of these reforms.
[41] Law of September 05, 2001 aimed at improving the employment rate of workers.
[42] Royal decree amending articles 56 and 58 of the royal decree of November 25, 1991 that regulated unemployment and inserted articles 36/1 to 36/11, 56/1 to 56/6, and 58/1 to 58/12 into the same decree.
[43] The legal pension age for women was equal to 60 years old until 1997. It was increased in one-year steps every three years from 1997 to 2009, reaching 65 in 2009. The legal pension age will be raised to 66 years old starting February 1, 2025 and to 67 years old starting February 1, 2030.
[44] More precisely, to be eligible for an old-age pension, individuals must comply with the following requirements: 60 years old with 44 years of career, 61 years old with 43 years of career, 62 years old with 43 years of service, and 63 years old with 42 years of career (law of August 10, 2015).

increased to 62 years old in 2012 and 63 years old in 2015 but with derogatory rules for very long careers and specific sectors.

Time credit. The time credit system offers a gradual retirement path to older workers by providing the option to reduce their working time either completely or partially in exchange for a replacement benefit. This program was created in 2003 as a response to the gradual restrictions within the UCS program. In fact, by providing a more flexible way to reduce employment for older workers, it was expected that the program would postpone early retirement among them. Eligibility rules initially allowed any worker who was above the age of 50 and satisfying some seniority conditions to reduce their working time (typically by 20% or 50%) for an indefinite period in exchange for a monthly lump sum payment from the federal employment agency. The program's popularity increased between 2003 and 2015. However, in 2012 and 2015, the federal government tightened access to the program by increasing the minimum eligibility age to 55 years old in 2012 and 60 years in 2015.

3. Literature Review

3.1. Causes of DI Growth in OECD Countries

The DI recipiency rate, defined as the proportion of DI recipients within the working-age population, experiences fluctuations over time, influenced by several factors. These factors can be listed as follows: (1) "size effects," which involve changes in the number of insured individuals within the working-age population, (2) "health effects," which are changes in the prevalence of severe health impairments among the insured population, (3) "incentive effects", which are changes in the costs associated with claiming and retaining DI benefits for workers or investing in preventive health care and work rehabilitation for firms, and (4) "institution effects", which are changes in DI eligibility/screening rules and RTW policies.

Recent theoretical models have sought to clarify how these factors interact with each other in a coherent framework (e.g., Low and Pistaferri 2015, Haller et al. 2023). One of the most comprehensive structural economic models of the DI application process was developed by Low and Pistaferri (2015), with the goal of simulating the welfare effects of alternative social security reforms in the US. Since this model is useful to conceptualize how different factors can impact the DI recipiency rate, we provide a summary of its key aspects.

Low and Pistaferri (2015) construct a life-cycle model, in which individuals maximize the present value of utility (derived from consumption, health, and leisure time). This model grants individuals control on three variables: the level of consumption, the decision to work, and the decision to apply for DI, UI, or means-tested welfare benefits. At each period, individuals are subject to idiosyncratic shocks that can affect their health or their productivity, thereby affecting wages and the opportunity cost of applying to DI. In the model, DI award decisions depend on the applicant's characteristics such as skills, age, and the severity of the health impairment as well as a stochastic process, which allows for decision errors.[45] The model also accounts for substitution effects between different social insurance and welfare programs by explicitly modeling the individual's decision to claim UI, DI, or other welfare benefits.

Although this model was initially designed and calibrated for the US economy, it synthesizes, in a coherent framework, some key mechanisms that drive fluctuations in DI recipiency rates across various countries. In fact, the model makes explicit a long-recognized conception of DI take-up as a decision that results from an interaction between health (which is conceived in the model as a three-state variable: "healthy," "moderate," or "severe" work limitation), economic incentives, and DI rules. A body of literature has attempted to empirically assess the role of each of these factors on DI recipiency rates in various countries.

Changes in the proportion of severe health limitations within the insured population are perhaps one of the most obvious causes of fluctuations in a country's DI recipiency rate. Yet, in many countries, periods of increasing rates have coincided with stable or even improving health indicators among the working-age population. For the US, Duggan and Imberman (2009) show that measures of self-reported health status among workers aged 50–64 improved between 1984 and 2004, while the rate of DI recipients kept increasing for this age group. Burkhauser et al. (2014) conduct a similar exercise for five OECD countries and find no evidence that measures of self-reported health status worsened in countries where DI recipiency rates increased rapidly.

However, accurately estimating the extent to which the increase in the number of DI beneficiaries is due to a deterioration in the population's state of health is a complex task, as

[45] More precisely, type I errors occur when truly disabled individuals are rejected, while type II errors occur when individuals who are not truly disabled are awarded DI benefits.

health is multidimensional and difficult to measure using an objective scale. One way to overcome this difficulty is to exploit survey data on various individual health indicators and merge them with information on respondents' work and social insurance status. For instance, Börsch-Supan et al. (2009) use the results of the Survey on Health, Aging, and Retirement in Europe (SHARE), which provides accurate data on objective and subjective health indicators for a sample of respondents aged 50 to 65 from different European countries. The authors find that controlling for these health indicators only slightly reduces the large international variations in DI recipiency rates, while controlling for institutional characteristics (e.g., insurance coverage rules, DI and UI replacement ratios) substantially reduce them.

Another way to indirectly assess the role of health is to use proxies that are highly correlated with individuals' health. In this respect, although not a perfect proxy for health, it is well established that individuals' age is a significant predictor of the prevalence of health impairments. Several studies have therefore assessed the role of population aging in the growth of DI recipiency rates in different countries (Duggan and Imberman 2009, OECD 2010, Burkhauser et al. 2014), finding a rather limited effect of population aging on the growth in rates. For instance, in an international comparison, the OECD (2010) finds that changes in the age structure of the working-age population can hardly explain more than one-third of the growth in DI recipiency rates in most OECD countries.

Given these results, there is a broad consensus among economists that health and demographic factors can hardly explain more than half of the observed growth in DI recipiency rates among OECD countries (Burkhauser et al. 2014, Liebman 2015). Therefore, a vast literature has focused instead on the role of economic incentives and DI rules. Following the model of Low and Pistaferri (2015), incentive effects can be conceived as changes in the opportunity cost to exit the labor market through DI. In this perspective, exogeneous economic shocks such as job loss or skill depreciation (e.g., due to foreign product competition, technological change, or task automation) can lead some workers to claim DI benefits because the expected value of staying in the labor market becomes lower than the expected value of claiming DI benefits.[46] This explanation has received a great deal of attention from economists over the last two decades, and many studies have indeed found

[46] These workers are called “conditional applicants” in the terminology of Autor and Duggan (2003).

large causal effects of economic shocks on DI recipiency rates (see, e.g., Black et al. 2002, Bratsberg et al. 2013, Charles et al. 2018, Andersen et al. 2019).

For instance, exploiting booms and busts of the coal industry in some US regions, Black et al. (2002) find that a 1% exogenous increase in local income per capita decreases DI spending per capita by 0.3%–0.4%. For Norway, Bratsberg et al. (2013) estimate that an exogeneous job displacement increases the probability of receiving permanent DI benefits by 2.6 pp (+121%) for men and 1.6 pp (+48%) for women. Also for Norway, Andersen et al. (2019) estimate that labor-demand-induced increases in local employment rates significantly reduce local DI caseloads.

The model of Low and Pistaferri (2015) also clarifies that DI claims are influenced by both the opportunity cost of working and the opportunity cost of claiming benefits from other social insurance or welfare programs. This type of substitution (or "communicating vessels") effect has been well documented empirically (e.g., Borghans et al. 2014, Lindner 2016, Petrongolo 2009, Lammers et al. 2013, De Brouwer et al. 2023). For instance, changes in the value of UI benefits may trigger some UI beneficiaries to switch to DI benefits (and vice versa). For the US, Lindner (2016) finds that a $1.00 increase in UI benefits reduces DI expenditures by $0.15. Changes in requirements imposed on the unemployed population may have similar effects. Indeed, for the unemployed, especially those furthest from the labor market, these programs can induce a switch from UI to DI as a way to escape the risk of having the benefits reduced or suppressed if they are not complying with the job search requirements. For instance, for the UK, Petrongolo (2009) estimates the effect of implementing job search requirements on jobseekers' future probability of being employed or receiving DI benefits. She finds that compared to individuals who entered UI three to six months before the reform, those who entered UI shortly after had a 2.5%–3% higher likelihood of having positive DI benefits and a 4%–5% lower likelihood of having positive employment earnings over the following year.

Finally, the model of Low and Pistaferri (2015) predicts that DI recipiency rates are largely affected by changes in DI eligibility and screening rules.[47] Changes in these dimensions have "mechanical" effects, i.e., changes in DI rejection rates following a DI claim, and "incentive"

[47] DI eligibility rules essentially pertain to the definition and measurement of disability as well as the degree of disability that grants access to DI benefits. DI screening rules encompass all elements that enter into account during the DI application process, such as those overseeing the evaluation, how medical tests are conducted, the average length of a DI application, and its administrative burden.

effects, i.e., changes in individuals' probability of applying for DI benefits. However, the implications of these policies are likely to vary. Indeed, increasing the degree of DI screening is expected to decrease both type I and type II errors, resulting in an ambiguous effect on the DI recipiency rate.[48] In contrast, because tightening DI eligibility criteria restricts the set of DI beneficiaries to those with more severe health impairments, its effect on the DI recipiency rate is unambiguously negative.

Illustrative examples of changes in DI eligibility rules can be found in Austria and the Netherlands. In Austria, the age after which DI eligibility criteria were relaxed[49] was increased from age 55 to 57 in 1996.[50] Staubli (2011) estimates that this reform decreased the share of DI recipients by 6–7.2 pp for workers aged 55–57, with a small positive effect on employment participation and large spillover effects on UI and sick leave participation. In the Netherlands, a nationwide re-evaluation of DI recipients according to stricter eligibility criteria was implemented in 1993 due to a strong increase in the DI recipiency rate over the past decade. Borghans et al. (2014) find large positive effects of this reform on employment participation yet with substantial spillover effects on other social security programs. The authors estimate that two years after the reform, people who experienced a decrease in their DI benefits were able to offset each forgone euro of DI transfers by an increase of €0.62 from work and €0.30 from other social security programs.

Illustrative examples of changes in DI screening can also be found in various countries. In the US, a 1984 congressional reform loosened the definition of disability by shifting the focus of medical assessments from checking for medically verifiable health conditions to considering "an applicant's ability to function in a work-like setting" (Autor and Duggan 2006, p. 78). Autor and Duggan (2003) show that this reform, coupled with a declining demand for low-skilled workers and rising DI replacement benefits, can explain a large share of the observed decline in unemployment and rise of DI recipients in the US between 1984 and 2001.

Moreover, other countries such as Switzerland and the Netherlands implemented reforms to improve the quality of the DI screening process. In Switzerland, a 2005 reform reduced the

[48] Note also that DI screening may increase the fixed cost of a DI claim (e.g., due to more administrative steps or more medical checks), which can deter some genuinely disabled applicants to apply for DI benefits.
[49] More precisely, before the reform, the criteria for accessing DI required a reduction in work ability by at least 50% compared to any reasonable occupation for workers aged below 55 and compared to a similar occupation for workers above the age of 55.
[50] This age was then increased gradually to 60 years old between 2013 and 2017 (Haller et al. 2020).

role of general practitioners in benefit award decisions by imposing information exchanges about the patients' dossier with physicians of the DI institution and allowed the DI institution to conduct its own medical evaluation if deemed necessary. Liebert (2019) finds that this reform reduced the number of DI admissions by 23% (essentially through reductions in mental and musculoskeletal disorders) and increased employment participation among potential DI claimants.[51] In the Netherlands the government introduced a program in 2002 called the Gatekeeper Protocol, which specifies a set of obligations for workers and employers during the first year of the sick leave period.[52] This involved frequent medical reviews and contacts between the two parties. In a recent evaluation, Godard et al. (2022) find that this reform decreased the share of sick leave spells that turn into DI spells (i.e., spells lasting more than one year) by about 40%. They also find that this reduction was principally driven by a higher work resumption rate despite also finding a non-negligible spillover effect on UI.

Some potential factors behind the increase in DI spells are, however, absent from the model of Low and Pistaferri (2015). Perhaps the most important of them is the role of employers relative to workers' health and ability to stay at the same firm with a health condition. This topic has recently received growing attention from scholars (see, e.g., Hawkins and Simola 2020, Aizawa et al. 2021, Prinz and Ravesteijn 2021, Godard et al. 2022). From an economic perspective, efforts made by employers to prevent workers' exit from the firm through DI are influenced by the relative costs and benefits of prevention and rehabilitation measures, which in turn are shaped by labor market regulation and firms' economic environment. For instance, if employment protection rules are stringent, employers may use DI as an alternative way to lay off workers.

An illustrative case highlighting this mechanism is observed in the Netherlands during the 1980s and 1990s. Koning and Lindeboom (2015) explain that the combination of high

[51] Note, however, it is unclear if the reform only decreased the share of type II errors or if the institution evaluated DI according to stricter rules.

[52] The program is well described by Koning and Lindeboom (2015), who write that "the Gatekeeper protocol spells out the required behavior of employers and workers starting with the first weeks of absence from the job. In particular, after a maximum of six weeks of absence, the employer and worker should make a first assessment of medical cause and functional limitations. Based upon this assessment, they subsequently must draft a return-to-work plan within eight weeks of absence. This plan should include several dates to evaluate and modify the plan, if relevant. If the worker has not fully returned to work at the end of the waiting period, the worker then files a disability benefit claim. Benefit claims are only considered admissible by the social benefit administration if they are accompanied by a return-to-work report, containing the original plan and an assessment as to why the plan has not (yet) resulted in work resumption. If the procedure was not followed, the employer may be obliged to continue providing sick pay for some additional months rather than having the worker transfer to disability benefits" (p. 160–161).

severance payments, lenient DI eligibility conditions, and the collapse of the Dutch manufacturing sector during this period were key factors contributing to the high entry rate of older workers into DI. Koning and Van Vuuren (2010) provide empirical evidence for these explanations by estimating that in the Netherlands, between 1993 and 2002, around 3% of all job terminations occurred through the DI scheme, accounting for around a quarter of all entries into the DI scheme over this period.

Deteriorations in the quality of working environments are another potential—yet hard to quantify—explanatory factor for the rise in the DI recipiency rate among employed workers. The last 30 years have been marked by a series of phenomena that have substantially transformed working environments, including trade liberalization, computerization and task automation, new managerial models, and, in some countries, increasing job strain in public service facilities, such as hospitals and nursing homes. However, their effects on the quality of working environments are not straightforward and may have been very different across sectors and occupations. Evaluating the evolution of working environments' quality remains challenging. On the one hand, aggregate statistics provided by the OECD show that working environment quality in Belgium has slightly improved over time, since a decreasing incidence of job strain among workers, from 30% to 26%, has been observed between 2005 and 2015 (OECD). On the other hand, this positive evolution contrasts with a sharp increase in DI entries caused by burnout (+40% in Belgium between 2015 and 2021 according to the NIHDI). Understanding whether this evolution is related to a deterioration in some working environments' quality or to societal changes outside the workplace requires future investigation.

Finally, a small literature has explored the role of social networks in social insurance claims, i.e., the effect of an individuals' social environment on the propensity to claim DI benefits (e.g., Dahl et al. 2014, Markussen and Røed 2015). Social networks may in fact amplify the effect of other factors on DI recipiency rates through three channels (Dahl et al. 2014). First, individuals may be better informed about how to make a successful DI claim when a higher share of their social network is already on DI (i.e., an "information" channel). Second, individuals' perceived or objective health may be influenced by the prevalence of perceived or objective health conditions in their social environment (i.e., a "belief" or "perception" channel). Third, social network effects of DI benefits may operate through changes in work norms, where individuals'

motivation for work decreases with the share of their social network being on social insurance (i.e., a "social norms" channel). Markussen and Røed (2015) find evidence for network effects in social insurance claims for a variety of social networks. They find that all else equal, the share of an individual's family, friends, and relatives who receive DI benefits positively influences the probability of claiming DI benefits but negatively influences the probability of claiming UI benefits, indicating that networks are likely to generate reallocations of jobless individuals across social insurance programs rather than negatively affecting the employment rate.

3.2. Causes of DI Growth in Belgium

A smaller literature has examined different potential factors behind the increase in DI spells in Belgium. Some of these studies have investigated the effects of population aging and increased labor market participation among some groups of workers (i.e., women and older workers) on the Belgian DI recipiency rate. For instance, Saks (2017) finds that almost all the increase in the DI recipiency rate between 1993 and 2016 can be explained by these two factors.[53] However, the method used in the author's study is limited by its reliance on a comparison between two points in time, whose choice is arbitrary. A closer look at the evolution of DI recipiency rates within age categories over this period reveals that they decreased among older workers until the early 2000s and have sharply increased since then (Jousten et al. 2014). Therefore, the findings would differ if a more recent reference period was used.

Moreover, labor market participation may also be fostered by public policies subsidizing some low-skilled jobs. In this respect, Leduc and Tojerow (2020) estimate the effect of the 2004 implementation of a large service voucher scheme (that heavily subsidizes jobs in the cleaning sector) on the labor market participation and DI recipiency rates among low-educated women. The authors document that its implementation fostered labor market participation in physically demanding jobs among formerly inactive women but also considerably increased their DI recipiency rate.[54]

[53] His analysis consists in comparing the actual evolution of the DI recipiency rate with a hypothetical rate, for which DI rates within each age category are kept constant at some benchmark period. Therefore, any change in the aggregate DI rate comes from age structure changes or insurance coverage rates.

[54] Exploiting differences in the timing of participation into the program and a coarsened matching approach, the authors show that the probability of being on LT DI five years after program entry increases by 4 pp.

Some studies have also analyzed substitution effects between different social insurance or early retirement programs and DI participation. Using an option value framework, Jousten et al. (2014) find a strong degree of substitution between old-age unemployment, UCS, old-age pension, and DI programs. The authors conclude that increasing the employment rate among older workers can only be achieved by tightening access to all these programs simultaneously. This conclusion may however be valid only for subsets of workers. Indeed, estimating the effect of increasing the eligibility age for the UCS program from 58 to 60 years old, De Brouwer and Tojerow (2022) find statistically significant effects on DI participation only for low-wage and part-time male workers.

Substitution effects between regular UI and DI programs have been studied by De Brouwer et al. (2023), who estimate the effect of monitoring the job search behavior of LT UI recipients on DI participation. They exploit the 2004 implementation of a job search monitoring program targeting all UI beneficiaries under 49 years old, starting from their 15th month of unemployment. Using an RD design around the age of 49, the authors show that three years after the start of JSM, treated individuals were not more likely to work but instead were 10 pp more likely to be on DI compared to similar control individuals. Moreover, multiplying the effect of the program on DI transfers by the number of individuals subject to the program, the authors estimate that about 4.78% of the sum of DI payments between 2007 and 2011 was attributable to the program's implementation.[55] Although this percentage is relatively small, it is just one of many other reforms that have occurred within the UI program over the last 20 years. As a result, the cumulative effect of all these reforms might have been much more substantial.

Overall, this literature review suggests that the different labor market policies implemented over the last 20 years in Belgium have had a strong positive impact on the DI recipiency rate, by fostering labor market participation among individuals with a weak connection to the labor market (low-educated women and older workers) and by increasing the attractiveness of DI with respect to UI.

Finally, it is important to mention that we have adopted a positive rather than a normative approach to explaining fluctuations in DI recipiency rates over time. While this positive

[55] Note that this analysis was restricted to individuals aged 40–49.

approach provides a better understanding of the factors that determine DI recipiency rates in different countries and over time, it does not answer the question of whether rising DI recipiency rates should be considered a ground for government intervention. Indeed, a normative approach requires accounting for the role of market failures and the objectives that DI policy should follow. Recently, many studies have started to adopt a normative approach to various aspects of DI programs, such as screening stringency, replacement benefits, and employers' financial incentives. Among these studies, there is a growing consensus that instead of focusing on how to reduce DI caseloads per se, policymakers should reflect on how to provide insurance for those in need while providing enough incentives for individuals and firms to foster workers' labor market attachment and preventive health care at the workplace (Low and Pistaferri 2020, Deshpande and Lockwood 2022). In Section 7, we discuss the results of this literature and their implications for potential future reforms in Belgium.

4. Trends in Participation Rates in DI and Other Social Insurance Programs

4.1. Trends in DI Recipiency

To examine the evolution of the LT DI recipiency rate more closely, Table 1 displays the evolution of the LT DI recipiency rate and the employment rate between 2005 and 2020, by gender and age category. We first see there has been a parallel increase in the LT DI recipiency rate (from 3.46% to 6.80%) and employment rate (from 62.12% to 64.99%[56]) between 2005 and 2020. The increase in the LT DI recipiency rate is particularly strong between 2015 and 2020 (+1.69 pp between 2005 and 2015 versus +1.65 pp between 2015 and 2020). For differences across gender, this increase is much stronger for women (+4.83 pp) than for men (+1.88 pp). Disaggregating these trends by age, we also see that for women, the increase has been strongest for those aged 45–54 (+6.23 pp) and 55–64 (+9.47 pp). Interestingly, these two categories see parallel increases of their employment rate (+10.54 pp and +20.36 pp for women aged 45–54 and 55–64, respectively).

In addition to these trends, the Belgian DI program has several well-known features common to most developed countries (Garcia Mandico et al. 2022). First, the increase in the DI

[56] The employment rates presented in this study are below the official employment rates reported by the EU Labor Force Survey (LFS). This disparity arises from the different definitions used to calculate the employment rates. The LFS defines the employment rate as proportion of the working age population who has worked at least one hour over a given year, while our measure reports the proportion of the working age population who is effectively working on December 31 of each year.

recipiency rate is mainly due to an increase in mental health and musculoskeletal disorders. Together, these disorders can explain about three-quarters of the increase in the number of LT DI recipients between 2005 and 2018 in Belgium[57] and constitute about 70% of all DI recipients today. Mental and musculoskeletal disorders have some specific characteristics compared to other diagnoses: they affect younger individuals on average and exhibit lower mortality rates. Moreover, since these diagnoses are harder to verify objectively, there is a larger "gray area" between disability and other employment barriers for these two conditions (Andersen et al. 2020).

Second, DI spells are characterized by a strong duration dependence and have low exit rates after one year of absence. The average duration of a LT DI spell was 5.7 years in 2015 and has remained fairly stable over time (NIHDI 2018). Furthermore, only a small share of LT DI recipients transition out of this status through employment. To illustrate this, Figure 2 presents an event-study analysis, displaying the share of individuals who are employed, disabled, on UI, or inactive from two years before to seven years after entry into LT DI. Panel (a) reveals that the employment rate remains constant at only 20% between two and seven years after DI entry.

Third, the DI recipiency rate exhibits significant geographic variations, depicted in Figure 3, showcasing local LT DI recipiency rates at the province level. These rates vary between 3.7% and 7.3% (between 11% and 19.6%, respectively) for individuals aged 20–54 (55–64, respectively) in 2020. De Brouwer and Tojerow (2018) examine the explanatory factors for these variations and find that local average income and local market tightness play key roles, although significant geographic variations persist even after controlling for these factors.

Other aspects of the Belgian DI program have been analyzed less because it is difficult to obtain precise data on the profile of DI recipients. In particular, we have little information on how DI recipiency rates vary across former labor market status and job characteristics. To address this gap, we use register data from the CBSS Datawarehouse, which provides micro-level information for the universe of individuals residing in Belgium. Table 2 displays the LT DI recipiency rates across different labor market statuses and job characteristics (column 1), as

[57] There were, respectively, 225,951 and 426,607 DI recipients in December 31, 2005 and 2018. Over this period, the number of DI recipients in mental (musculoskeletal and other, respectively) conditions increased by 79,741 (74,710 and 46,205, respectively) (NIHDI).

well as the representativeness of each category in the number of DI recipients (column 2), in December 31, 2015.[58]

The table first decomposes LT DI recipiency rates by labor market status and shows that individuals on regular UI have the highest LT DI recipiency rate (20.2%) and constitute 29% of the number of DI recipients. The rate is also higher for salaried workers (6.0%) compared to self-employed workers (3.5%) and is almost zero for civil servants (because the latter have a distinct sickness absence scheme). Last, it is low among individuals in other labor market statuses[59] (3.7%), which is not surprising given that many individuals in these statuses are not insured against disability.

Table 2 also focuses on the group of salaried workers and displays LT DI recipiency rates along several dimensions. First, the rates vary substantially across NACE one-digit sectors, with the highest observed in the following sectors: construction (8.6%), the human health and social work activities (8.2%), administrative and support service activities (7.5%), and accommodation and food service activities (7.1%). Moreover, the table displays the LT DI recipiency rates for the 10 joint commissions[60] that are the most represented among LT DI recipients, with 10.5% of formerly salaried LT DI recipients working in the interim sector (322), which is essentially composed of female workers working in the "service voucher" scheme, analyzed by Leduc and Tojerow (2020). The other joint commissions show that LT DI recipients are over-represented by the construction, health, manufacturing, hoteling, and transport sectors.

Examining job characteristics, the table shows that LT DI recipiency rates are higher among blue-collar workers (i.e., 9.3% versus 3.8% for white-collar workers) and low-wage workers (7.6% in the lowest quartile versus 3.1% in the top quartile of the wage distribution), while they are relatively homogeneous across firm size. Finally, the table shows the group of unemployed jobseekers and separates it by unemployment duration. The LT DI rate among long-term unemployed workers (20.7%) is slightly higher compared to short-term

[58] To construct the rates displayed in Column (1), for each category, we took the total number of DI recipients on December 31, 2015 who were observed in that category before DI entry and divided it by the total number of individuals observed in this category (including DI recipients) on December 31, 2015.

[59] The "other" category contains the following labor market positions: unemployed non-jobseeker, welfare benefits, pre-pension, early retirement, children benefiting from family allocations, or being outside of the labor market without receiving any benefits.

[60] In Belgium, joint commissions serve as platforms where representatives of employers and workers convene. Their primary objective is to bring together companies involved in similar activities and establish regulations tailored to their specific working conditions.

unemployed (17.5%) workers, but the number of recipients who were formerly unemployed is over-represented by long-term unemployed jobseekers (86.7%).

Finally, Table 3 provides a perspective on the evolution of the DI recipiency rate and several health indicators, displaying aggregate health data for the years 2005 and 2021 (2004, 2008, and 2018, respectively, based on data availability) and broken down by gender, age, and revenue quintile. The table presents a mixed picture of health trends in Belgium. While the share of individuals reporting being in “bad” or “very bad” health and the prevalence of long-standing health problems among the population have remained stable over the period 2005-2021, other health indicators show different patterns. Indeed, the table shows a significant increase in the share of severe long-standing health limitations (+1.4 pp) that is more pronounced among women (+1.6 pp), individuals aged 55–64 (+2.3 pp), and individuals in the lowest quintile of revenue (+2.6 pp). More striking is the evolution of the share of individuals in psychological distress (+5 pp) and the share of those having experienced depression over the last 12 months (+1.5 pp). This set of descriptive indicators indicate that the population's health has simultaneously improved in some dimensions and deteriorated in others. The increase in the proportion of depression in the population reflects the complex interrelationship between health and other socio-economic factors, which may have deteriorated over time.

4.2. Substitution Effects Across Social Insurance Programs

Since the economic literature confirms a high degree of substitution between DI and other social insurance programs, it is insightful to analyze their joint evolution over time. Figure 4 and Figure 5 display the evolution of the share of the population receiving benefits from different social insurance programs,[61] respectively, for individuals aged 20–54 and 55–64. The figures show significant fluctuations in the proportion of the population benefiting from each program over time. In addition to the strong increase in the DI recipiency rate, they show a marked decrease in the regular UI recipiency rate for both men and women. Interestingly, the decrease has been stronger since 2012–2013, around the time of the reforms were

[61] The data were extracted from the CBSS Datawarehouse online. The classification was based on the socio-economic nomenclature provided by the CBSS.

implemented within the UI program that fostered the reduction of UI benefits over time (see Section 0).

Figure 5 also illustrates a marked decrease in the shares of men and women aged 55–64 on UCS/Inactive UI[62], particularly since 2011–2012, when eligibility rules were tightened and financial disincentives were imposed on employers to restrict new entries in the UCS program. Panel (b) shows a marked decrease in the old-age pension rate among women in 2005–2006 and 2008–2009 due to the increase in the old-age pension age, respectively, from 63 to 64 in 2006 and from 64 to 65 in 2009. Furthermore, Figure 5 shows a marked difference between men and women in the share of the population in the "other" category, i.e., individuals who are neither working nor receiving any kind of social security transfers. Notably, this share was highest among women and decreased markedly during the observation period, reflecting their increasing participation in the labor market. On the other hand, it was lower for men and increased slightly since 2003. Overall, both figures support the notion that the increase in the DI recipiency rate may be part of a broader reallocation of social security beneficiaries across programs, which can be directly related to changes in the legislative rules governing each program.

In a second step, we focus on the link between the UI and DI programs by examining their joint evolution at the local level. Figure 6 illustrates the relationship between the evolution of local LT DI and UI rates[63] at the province level and over the period 2005–2020 for individuals aged 20–54 (panel (a)) and 55–64 (panel (b)). Interestingly, there is a clear negative correlation between the changes in LT DI and UI rates for people aged 20–54, while this relationship is less clear for those aged 55–64. Panel (a) shows that on average, a 1 pp decrease in the UI rate corresponds to a 0.29 pp increase in the LT DI rate. By contrast, panel (b) shows that the estimated coefficient for the slope of the line is both close to zero and statistically insignificant. This result may indicate that substitution effects between DI and UI may have been stronger for individuals aged 20–54 than those aged 55–64. However, it could also indicate that

[62] Inactive UI refers to a category where individuals are unemployed and exempted from being active on the labor market. Most exemptions are granted due to old-age, but some exemptions can be granted due to family circumstances or participation to job training programs.

[63] To account for substitution effects between the different kinds of UI programs, we consider both regular and old-age UI/UCS programs.

substitution effects between old-age UI/UCS programs and DI have been stronger in some provinces than others.

5. Empirical Analysis and Data

5.1. Empirical Analysis

The aim of our main empirical analysis is to assess the contribution of several potential explanatory factors to the increase in the LT DI entry rate, i.e., the probability that an individual who is not on ST/LT DI at some reference period will be observed at least one day on LT DI over the next two years. We focus on the LT DI entry rate rather than the LT DI probability because we cannot observe the former labor market status of individuals who entered DI before January 2003. Moreover, since the average duration of LT DI recipiency spells has remained fairly constant over the period covered by our data (2005–2015), the increase in the DI recipiency rate is primarily the result of an increase in the LT DI entry rate.

Our empirical method relies on a modified version of the Blinder-Oaxaca (B-O henceforth) decomposition for dependent binary outcomes, which has been developed by Fairlie (1999). In the classical version of the B-O method, regression analyses are performed, and the mean group difference in an outcome Y is decomposed into two components: one that reflects the mean group difference in the set of explanatory variables (i.e., change of the share of people by socio-economic category) and another that reflects the group difference in the values of the coefficients related to the explanatory variables as well as the group difference that is not explained by the model (i.e., changes of the propensity to enter into DI conditional on a certain socio-economic category). The method of Fairlie (1999) adapts this strategy to binary outcomes, using logit regression models instead of OLS. Formally, a valid expression for this decomposition is the following:

$$\overline{\mathrm{Y}}^{2013} - \overline{\mathrm{Y}}^{2005} = \left[\sum_{\mathrm{i}=1}^{\mathrm{N}^{2013}} \frac{\mathrm{F}\left(\mathbf{X_i^{2013}}\widehat{\boldsymbol{\beta}}^{\mathbf{2005}}\right)}{\mathrm{N}^{2013}} - \sum_{\mathrm{i}=1}^{\mathrm{N}^{2005}} \frac{\mathrm{F}\left(\mathbf{X_i^{2005}}\widehat{\boldsymbol{\beta}}^{\mathbf{2005}}\right)}{\mathrm{N}^{2005}}\right] + \left[\sum_{\mathrm{i}=1}^{\mathrm{N}^{2013}} \frac{\mathrm{F}\left(\mathbf{X_i^{2013}}\widehat{\boldsymbol{\beta}}^{\mathbf{2013}}\right)}{\mathrm{N}^{2013}} - \sum_{\mathrm{i}=1}^{\mathrm{N}^{2013}} \frac{\mathrm{F}\left(\mathbf{X_i^{2013}}\widehat{\boldsymbol{\beta}}^{\mathbf{2005}}\right)}{\mathrm{N}^{2013}}\right], \quad (1)$$

where $\overline{\mathrm{Y}}^{\mathrm{k}}$ is the LT DI entry rate at year k, i.e., the share of DI entries between December 31 of year k $(k = 2005, 2013)$ and December 31 of year $k + 2$. $F(.)$ is the cumulative distribution function of a logistic distribution, $\mathbf{X_i^k}$ is a vector of individual characteristics observed at December 31 of year k, and N^{k} is the sample size at December 31 of year k. The

first part within brackets is the part of the difference that is explained by mean differences in individual characteristics, while the right part within brackets is the part that remains unexplained. The computation of the contribution of each factor in the total explained difference is more complex in the case of non-linear models than in the basic version of the B-O method. However, once these contributions have been obtained, they can receive the same interpretation as in the standard B-O method (see Fairlie 2005 for a detailed description of how to obtain these distinct contributions).

The choice of covariates that we include in our analyses depends on the population that we analyze. We start by performing analyses for the whole working-age population (i.e., individuals aged 20–64). For this group, we aim to assess the extent to which the increase in the LT DI entry rate can be explained by evolutions in household composition, population aging, and increasing labor market participation. To do so, we include the following covariates in our analyses: household type (5 dummies), female gender (0/1), age category (9 dummies), and labor market position (9 dummies).[64] Note that it is likely that interaction effects between these covariates influence our results. For instance, we expect that the effect of gender on the LT DI entry rate to be greater for salaried workers than for welfare recipients, simply because very few welfare recipients are insured against disability regardless of gender. Additionally, with labor market participation increasing more among women than men, we may underestimate the share of the LT DI entry rate increase that can be explained by gender and social status. To address this, we interact gender, age category, and labor market status in our decomposition.

We then perform analyses for the population of salaried workers aged 20–64 and include the following covariates in the regression: household type (5 dummies), female gender (0/1), age category (9 dummies), NACE one-digit sector (20 dummies), blue-/white-collar contract (0/1), firm size (4 dummies), daily working hours category (4 dummies), daily wage (in 2013 euros), and career length category (8 dummies).[65] This allows us to assess to the extent to which the

[64] For household types, these groups are couples without children, couples with children, single people without children, single people with children, and other. For the age category, we form the following classes: 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, and 60–64. For labor market position, the categories are salaried employment, self-employment, civil-servant, regular UI, old-age UI/UCS, welfare benefits, family allowances, handicap benefits, and unknown.

[65] For firm size, the categories are (in number of workers): 1–19, 20–99, 100–499, and ≥500. For daily working hours, the categories are (in full-time percentages) 0%–19%, 20%–39%, 40%–59%, 60%–79%, 80%–99%, and ≥100%. For career length, the categories are (in contribution years) 0–4, 5–9, 10–14, 15–19, 20–24,25–29,30–34, and ≥35.

increase in the LT DI entry rate among salaried workers can be related to changes in demographic and basic job characteristics.

5.2. Data

We use data from the Belgian Labor Market Data Warehouse (LMDW) of the Crossroad Bank for Social Security (CBSS), which aggregates register data from governmental and social security institutions. These data provide individual information between January 2003 and December 2015, for any person who possessed a national registration number during that period. Our dataset includes yearly information from national registers (for personal information) and taxable income (data on income and transfers). It also includes quarterly information from the National Social Security Office (data on labor activities), the National Employment Agency (data on unemployment), the National Institute for Health and Disability Insurance (data on long-term disability), and the National Intermutualist Board (data on short-term disability).

To construct our dataset, we select all individuals aged 20–64 residing in Belgium during the year of selection (2005 and 2013). Then, we drop those who were already on ST or LT DI on December 31 of these years. We end up with a sample of 5,681,793 individuals in December 31, 2005 (2005q4) and 6,099,537 individuals in December 31, 2013 (2013q4). To perform our analyses for salaried workers, we restrict this dataset to those who are observed in a salaried job on December 31 of these years and drop those with unobserved job characteristics. We end up with 2,469,813 individuals in 2005q4 and 2,692,714 individuals in 2013q4.

5.3. Descriptive Statistics

Table 4 and Table 5 provide summary statistics for the variables used in our regressions in 2005q4 and 2013q4, respectively, for the working-age population and salaried individuals. Table 4 starts by documenting the increase in the LT DI entry rate for the population aged 20–64, from 0.7% to 1.2% (+0.5 pp), mostly driven by mental (+0.2 pp) and musculoskeletal (+0.2 pp) disorders. Looking at the evolution of demographic characteristics, several significant changes are evident: a decrease in the proportion of women[66] (–0.8 pp), a decrease in the proportion of couples with children (–1.4 pp), an increase in the proportion of single

[66] This is because the DI recipiency rate has grown faster for women and we exclude individuals who are already on DI at the beginning of each period.

households without children (+0.7 pp) and other households (+1.3 pp), and increases in the proportions of older individuals (+0.9 pp, +0.7 pp, and +2.3 pp for individuals aged 50–54, 55–59, and 60–64, respectively). In addition, analyzing the distribution of the labor market status, we observe increases in the proportions of salaried workers (+1.0 pp), self-employed workers (+0.2 pp), individuals on welfare benefits (+0.4 pp), family allowances (+1.1 pp), and handicap benefits (+0.3 pp). Conversely, there were decreases in the proportions of civil servants (–1.0 pp), individuals on regular UI (–0.6 pp), old-age UI/UCS (–0.5 pp), and individuals who are neither working nor receiving any kinds of social security transfers (–0.9 pp).

Examining the characteristics of salaried individuals in Table 5, we observe a 0.5 pp increase in LT DI entry rate, mainly due to mental and musculoskeletal disorders (+0.2 pp). For demographic characteristics, the table shows an increase in the proportions of single households with and without children (+0.8 pp and +0.6 pp, respectively), women (+2.1 pp), and older individuals (+1.3 pp, +2.9 pp, +2.8 pp, and +1.4 pp for individuals aged 45–49, 50–54, 55–59, and 60–64, respectively).

Regarding the sectoral repartition of workers, there is a significant decrease in the proportion of workers in manufacturing (NACE C; –4.4 pp) and an increase in the proportion of workers in administrative and support services (NACE N; +3.5 pp). Other job characteristics highlight a decrease in the proportion of blue-collar workers (–2.1 pp), an increase in proportions of workers employed at firms with 100–499 workers (+1.2 pp), a small decrease in the proportion of full-time jobs (–0.2 pp), a slight increase in the mean daily salary (+0.7 euros/day), and an increase in the number of workers with intermediate/high contribution years (+1.5 pp and +2.2 pp, for 15–19 and 20–24 contribution years, respectively).

6. Results

6.1. Regression Results

Table 6 presents the results of estimating a logistic regression for the population aged 20–64, where each categorical variable is interacted with a dummy equal to one for being at period 2013q4. This allows us to see the "pure" effect of time for each category while controlling for composition effects.[67] The coefficients in the table display the estimated LT DI entry rates for each category. Notably, the entry rates into LT DI are higher for women, single households with children, individuals aged 50–54, and individuals on regular UI, irrespective of the period. Comparing the estimated probabilities across the two periods (in column 5), we observe an increase in the LT DI entry rate in all categories (except for children on family allowances), with the largest increases seen in single households with children (+0.315 pp), women (0.266 pp), individuals aged 50–54 (+0.327 pp), and individuals on regular UI (+1.72 pp).

Since our exercise is primarily focused on two periods, the table does not allow us to see whether the increase in the LT DI entry rate has been homogeneous across time or not. Therefore, in Appendix Figure A. 1, we report the evolution of the entry rate into LT DI by labor market status, interacting each category with dummies equal to one, respectively, for reference periods 2005q4, 2007q4, 2009q4, 2011q4, and 2013q4. The LT DI recipiency rate strongly increases from period 2011q4, in particular for individuals on regular UI. Since this period coincides with the reforms of UI benefits calculation, implemented in 2012, we interpret this as further support for a substitution phenomenon between UI and DI due to more restrictive UI rules.

[67] Note that we do not interact the variables age, gender, and labor market status in this exercise to keep the results tractable.

Table 7 reports the coefficients from a similar exercise but for the population of salaried workers aged 20–64. The highest coefficient increases between the two periods are in the following categories: single household with children (+0.47 pp), women (+0.45 pp), workers aged 55–59 (+0.62 pp), workers in the human health and social work activities sector (NACE Q; +0.48 pp), blue-collar workers (+0.46 pp), workers with the lowest working hours (+1.67 pp), and workers with five to nine contribution years (+0.48 pp).

Overall, this first regression exercise suggests that the increase in the LT DI recipiency rate is driven by higher rates within specific demographic categories, labor market statuses, and job characteristics, with higher increases among women, single households with children, older individuals (i.e., individuals aged 45–59), and workers in strenuous and mentally demanding occupations (i.e., health sector, blue-collar workers) or with the lowest levels of labor market attachment (part-time workers and workers with a low number of contribution years).

6.2. Fairlie Decomposition

Table 8 displays the results of the Fairlie decomposition for the overall population aged 20–64. Only 5.5% of the increase in the LT DI entry rate can be explained by evolutions in household composition or labor market participation, gender, and age. Looking at the separate contributions of each explanatory factor, we see that the interaction between labor market status, age category, and gender accounts for 92.3% of the explained variance, while household composition accounts for 7.7%. Overall, these results strongly contradict the hypothesis that the recent increase in the LT DI entry rate (and by extension in the number of LT DI) is due to population aging and higher labor market participation of women and older workers.

We complement these results in two ways. First, since the increase in the DI entry rate has been primarily driven by an increase in mental health and musculoskeletal disorders, we run the Fairlie decomposition by diagnostic type, using dependent variables dummies equal to one if an individual is observed with mental, musculoskeletal, or other disorders. Appendix Table A. 3 displays the results of this exercise. The explained parts of the increases in LT DI entry rates are as follows: –3.0% for mental disorders, 9.2% for musculoskeletal disorders, and 19.9% for other disorders. These findings suggest that changes in observable characteristics

have contributed slightly negatively to the evolution of the LT DI entry rate into mental disorders over the covered period.

Appendix Table A. 4 displays the results of running the Fairlie decomposition separately by gender. Not surprisingly, the increase in the LT DI entry rate is higher for women (+0.55 pp) than for men (+0.34 pp). Moreover, while evolutions in the composition of household, age, gender, and labor market status explain 15% of this increase for men, they explain a negligible portion (0.1%) of this increase for women.

Next, we focus on the group of salaried workers aged 20–64 and estimate the contribution of changes in demographic and job characteristics to the increase in the LT DI entry rate. Table 9 shows that the explained part amounts to 16.2% of the rate's increase.[68] Interestingly, we see that some factors contribute to this evolution in opposite directions. Population aging constitutes the highest share of the explained part (104.2%), while sectoral composition (1.3%), firm size (9.8%), household composition (6.8%), and daily salary (4.9%) play a minor but positive role. By contrast, evolutions in the share of blue-collar workers (–5.6%), working hours (–14.7%), and career length (–6.6%) contribute negatively to the rate's evolution.

We further decompose our analysis by type of diagnostic and gender, presenting the results in Appendix Table A. 5. The increase in the LT DI entry rate due to other disorders can be better explained by changes in demographic and job characteristics, with the explained part amounting to 32.1%, compared to 18.2% and 10.7% for mental health and musculoskeletal disorders, respectively.

Finally, in Appendix Table A. 6, we run separate decompositions for men and women. Interestingly, the results show that the explained part of the increase in the LT DI entry rate is equal to 43.1% for men and 24% for women, i.e., higher than the 16.2% observed when pooling genders together. This suggests that the interaction effects between gender and other characteristics play a non-negligible role in explaining the aggregate increase in the LT DI recipiency rate.

Overall, our results can be summarized as follows. For the population aged 20–64, the strongest increase in the LT DI entry rate occurs among single households with children,

[68] Note that this result remains almost unchanged if we introduce an interaction effect between sector, age, and gender.

women, older individuals (i.e., those aged 45–59), and individuals on regular UI. For the latter group, this increase is more marked since 2011q4, when the reforms were implemented in the UI program in 2012. The increase in the LT DI entry rate for this population can be only marginally explained by population aging and increasing labor market participation among some groups (i.e., women and older workers). Moreover, among salaried workers, the increase in the LT DI entry rate is more significant for older workers (i.e., aged 45–59), workers in strenuous and mentally demanding occupations (i.e., health sector, blue-collar workers), and workers with poor labor market attachment (part-time workers and workers with a low number of contribution years). Last, for salaried workers aged 20–64, the evolution of demographic variables and basic job characteristics only marginally explain the increase in the LT DI entry rate. However, running separate analyses by gender can improve the explained part to about one-quarter for women and one-third for men.

Our results are broadly in line with previous studies that find minor roles for population aging and increasing labor market participation in the increase of the DI recipiency rate across many OECD countries (OECD 2010, Duggan and Imberman 2009, Burkhauser et al. 2014). In particular, the strong increase in the LT DI entry rate among individuals on regular UI supports the hypothesis of a substitution phenomenon between the two insurance programs, possibly due to the different reforms in the program over the last 20 years. Nevertheless, the substantial increase in the LT DI entry rate among salaried workers cannot be explained by changes in basic job characteristics such as sector, occupation, or wages, indicating that other causes are at work.

7. Discussion

The increase in the DI entry rate in Belgium is not primarily driven by population aging or increasing insurance coverage among the working-age population. Instead, it suggests that changes in the behavior of workers and firms in response to a changing economic and legislative environment might better explain the rising Belgian DI recipiency rate. This finding indicates considerable opportunities for public intervention to address this phenomenon. In this section, we explore current and potential policies to tackle the high DI recipiency rate in Belgium, using the conceptual framework of economic theory.

To economists, all DI programs face a trade-off between the benefits (i.e., consumption smoothing) and the costs (i.e., incentives for workers and employers to use the scheme in their self-interest) of providing insurance against the risk of disability. As explained in Section 3, the incentive costs of DI programs for workers originate from reduced labor supply and transfers between social insurance programs, while for employers, these costs originate from sub-optimal investments into preventive health care and work rehabilitation. Moreover, the size of these incentives is influenced by internal factors (eligibility rules and DI screening, replacement benefits, the provision of vocational rehabilitation, and whether the scheme is experience rated or not) and external factors (e.g., labor market tightness, the attractiveness of other social insurance programs, and firms' competitive environment). Therefore, a comprehensive reflection on the role of public policies to reduce DI caseloads should include considerations on both the internal and external factors affecting the incentive costs of DI programs. In this discussion, we start by looking at reforms within the DI program and then provide some reflections on possible reforms in other areas of employment policy.

7.1. Reforms of the DI Program

Based on our review of the literature and recent policy debates, there are several areas for potential improvements to the efficiency of the Belgian DI program: (1) providing greater support to DI recipients in returning to work and coordinating stakeholders involved in the RTW process, (2) screening employers' and workers' efforts to resume work, (3) increasing employers' responsibility in the payment of DI benefits, and (4) reforming DI eligibility rules and benefits. In the following paragraphs, we discuss the federal Belgian government's approach to these different areas in light of the existing literature on optimal DI policy and provide guidelines for policymakers.

Providing greater support to DI recipients in returning to work and coordinating stakeholders involved in the RTW process. As discussed in Section 0, the cornerstone strategy of the Belgian government to reduce the number of DI recipients has consisted so far in promoting a swifter return to work, mainly during the first year of the DI spell. This has been done by (1) clarifying the role of each stakeholder (i.e., the worker, the employers and the members of the medical staff), (2) designing a more standardized calendar of actions during the first months of the DI spell, (3) improving DI recipients' access to vocational training and

job search assistance programs, and (4) increasing incentives to work part time during the benefit period through partial DI schemes. Unfortunately, to our knowledge, no study has estimated the effects of these reforms in a quasi-experimental setting. Moreover, it is likely that these effects will take time to materialize since they may require a deep reorganization of some well-established processes within firms and public health insurance funds. Despite the absence of a clear retrospective vision of the effect of these reforms, some problematic aspects of the current RTW process should be underlined.

Screening employers' and workers' efforts to resume work. A recurring concern among stakeholders is the lack of communication and coordination in the RTW process (Teller and Raeymaekers 2017). The 2016–2017 reform addressed this issue to some extent by clarifying the roles of the health insurance fund's advisory doctor and the employer's occupational doctor. Moreover, in 2022, RTW coordinators were introduced to improve coordination further, but there is still a perceived shortage of RTW coordinators to adequately support the high number of DI recipients. This is unfortunate as studies have shown that RTW coordinators can effectively promote DI exit rates to employment, particularly through regular contacts with DI recipients (Dol et al. 2021, Høgelund and Holm 2006, Fontenay and Tojerow 2022). Fontenay and Tojerow's (2022) research in Belgium supports this, demonstrating the positive employment effects of providing tailored and intensive job search assistance for DI recipients with mental health conditions. Their study, based on an NIHDI randomized control trial from 2018 to 2019, finds that intense job search assistance largely outperforms the more classical RTW scheme (i.e., vocational training), with treated individuals being 9.5 pp more likely to work compared to similar control individuals.[69]

Another recurring concern is the reluctance of many employers to invest resources in reintegrating disabled workers back into the workplace (Teller and Raeymaekers 2017, Akgüç et al. 2021). The 2016–2017 reform has been criticized for inadequate monitoring of the reasons given by employers for not reintegrating their workers (De Greef and Deroubaix 2018, Akgüç et al. 2021). Additionally, some employers have cited workers' lack of cooperation as a hindrance in the RTW process. The low level of monitoring of employers' and workers' efforts reintegration efforts is mainly due to employer representatives' reluctance for the NIHDI to

[69] These results are somehow mitigated by the fact that the employment effect is driven by higher rates of DI recipients who hold a part-time occupation while on claim.

interfere in the firms' relationship with their workers and worker representatives' preference for voluntary participation in the RTW plan.

The desirability of stricter monitoring of employers' and workers' efforts to reintegrate into the firm remains an open question. Such a policy could have positive effects by reducing moral hazard behaviors on both sides of the labor relationship, revealing the actual levels of efforts to reintegrate workers into the firm (or to find employment somewhere else).[70] However, overly strict monitoring could lead to presenteeism, which can harm workers' health and firms' productivity, or deter sick workers from making a DI claim, pushing them toward other social insurance programs.

Moreover, since DI screening is costly and often imperfect, it is difficult to assess ex-ante whether such a policy will be cost-effective. The Dutch experience of the Gatekeeper Protocol, where both employers' and workers' efforts to return to work at the current job or elsewhere are monitored by the national insurance, shows that such programs have been successful in fostering the work resumption rate (De Jong et al. 2011, Godard et al. 2022). Therefore, studying how to design a RTW program that integrates a screening system for employers' and workers' reintegration efforts while minimizing potential side effects would be a fruitful area for future research.

Increasing employers' responsibility in the payment of DI benefits. Nevertheless, while monitoring reintegration efforts during DI spells could effectively reduce the lengths of the spells, it may not effectively promote preventive health care at the workplace. Therefore, imposing financial incentives for employers to reduce DI caseloads among their workers could also be an effective approach. A recent Belgian reform has taken a step in this direction, imposing higher employer social contributions for firms with very high DI inflows (with respect to the sector average). However, the penalty size (i.e., an increase in employers' social contributions of 0.625 pp) remains much smaller than in the Dutch system.[71]

[70] More precisely, the negative effect of a stricter screening system occurs through two channels. The first channel is through a higher rejection rate of false DI claims, i.e., when the reintegration efforts of firms or workers are deemed insufficient by the insurance. The second channel is through an incentive effect, where stricter DI screening generates self-screening among potential DI applicants, which reduces DI claims among individuals with less severe health impairments. In the Netherlands, De Jong et al. (2011) estimate the effect of a stricter enforcement of the Gatekeeper Protocol (i.e., stricter screening of DI applications) in some regions of the Netherlands and show a negative effect of stricter DI screening that is mostly driven by a lower rate of DI claims, i.e., through higher self-screening of potential DI applicants.

[71] In comparison, in the Netherlands, in 2001 the differences between minimum and maximum insurance premia amounted to 3.79 pp and 5.95 pp, respectively, for small and large firms (Koning 2009).

The effectiveness of imposing financial penalties on employers to curb DI recipiency rates has garnered attention from economists (e.g., Koning 2009, De Groot and Koning 2016, Hawkins and Simola 2020, Aizawa et al. 2021, Prinz and Ravesteijn 2021), leading to a growing area of study. The Netherlands' experience with the introduction of an experience rating system in 1998 provides valuable insights that could inspire future reforms of the Belgian DI program. Koning (2009) finds that the experience rating system introduced in the Netherlands reduced the DI benefit receipts within firms by 15%.[72] However, it is essential to consider potential side effects.

One concern is that experience rating systems may discourage employers from hiring workers with existing health limitations or past DI episodes. Prinz and Ravestijn (2021) analyze this issue by exploiting the expansion of experience rating to temporary workers in the Netherlands in 2012. Compared to Koning (2009), their study reveals even larger reductions of firm-level DI benefits receipts (by 24%), driven by reductions in mental and musculoskeletal disorders. Additionally, the reform did lead to a reduction in the hiring rate of individuals with previous DI episodes, but this selection effect accounts for only 14% of the total effect of the reform on DI benefits. While not negligible, this effect is smaller than the gains resulting from lower DI inflows.

Another side effect of experience rating systems is that the burden of employers' DI costs might disproportionately fall on smaller or less productive firms or on sectors involving high degrees of mental and physical workloads. For instance, in the Belgian "service voucher" sector (which accounts for around 10% of all salaried DI beneficiaries), accommodating the workplace is challenging due to the nature of the tasks (cleaning services) and workers' low level of education. The recent Belgian reform addressed this concern by exempting smaller firms from the new rules and restricting the comparison of DI inflows into among firms in the same NACE four-digit sector. However, this solution leaves incentives to reduce DI inflows very much unchanged for the vast majority of employers. Implementing an experience rating system similar to the one in the Netherlands (where firms' insurance premium increases continuously based on past DI costs between two bounds) could provide better incentives for

[72] The author also shows that the effect took time to materialize because employers were not correctly informed about the financial consequences of the reform at the time of implementation. Therefore they reacted only when their insurance premiums substantially increased.

all firms, possibly with adaptations across sectors. Additionally, imposing financial penalties for employers with financial support for workplace accommodations or other rehabilitation services could further enhance the effectiveness of such policies.[73]

Reforming DI eligibility rules and benefits. Another question mark for future reforms revolve around whether the levels of DI benefits or DI eligibility rules should be tightened. Extensive evidence indicates that DI recipients respond to financial incentives by increasing their labor supply (e.g., Maestas et al. 2013, Borghans et al. 2014, Kostøl and Mogstad 2014), though these effects are very heterogeneous across individuals.[74] Assessing whether the benefits (i.e., fiscal savings) of such policies outweigh their own costs (i.e., lower insurance for those genuinely in need) is not clear, as it relies on the institutional and economic context of each country. For instance, using the structural life-cycle model described in Section 3, Low and Pistaferri (2015) find that the US DI program has been characterized by large rates of false DI claim denials (i.e., about 66% for younger workers and 33% for older workers). According to their findings, relaxing DI eligibility rules and increasing DI benefits would improve welfare in the US economy. In contrast, using a "sufficient statistics" approach to assess optimal DI benefits and eligibility rules in Austria, Haller et al. (2023) show that the Austrian DI eligibility rules have been too lenient and tightening these rules would be a more effective approach than decreasing DI benefits (since it has a greater positive fiscal saving effect at a lower insurance cost).[75]

In Belgium, where DI replacement benefits are already lower than in Austria and the Netherlands (which amount to about 70% of previous earnings), reducing DI benefits is likely to increase the risk of poverty among DI recipients, which is not desirable from a societal perspective. Moreover, tightening DI eligibility rules may positively affect labor supply, which could have strong spillover effects on UI (as shown by Borghans et al. 2014) and negatively impact job match quality. In the absence of more empirical evidence on the welfare effects of

[73] Aiazawa et al. (2021) explore this question by analyzing a reform in the state of Oregon (the US) that reduced the size of wage subsidies offered to employers to reintegrate their injured employees. The authors observe a significant long-run decline in the employment rate and labor earnings of injured workers following the reform.

[74] In particular, Kostøl and Mogstad (2014) show that providing financial incentives for DI recipients to return to work have low and/or no statistically significant effect on the future employment rate for workers over 50 years old, workers living in high unemployment rate areas, and low-skilled workers.

[75] However, the authors do not assess the potential insurance costs from these reforms, such as increased presenteeism while being sick or reduced job match quality.

these policies for Belgium, the question of whether to expand or tighten DI benefits and DI eligibility rules remains open.

7.2. Reforms Outside the DI Program

The empirical evidence presented in this paper shows clear evidence of a significant overlap between the populations of UI and DI recipients. As such, it is crucial to consider the implications of this overlap for the design of other social insurance programs. Notably, the reforms within the Belgian UI program over the past two decades have made DI a more attractive option than UI for many individuals. This is due to substantially higher minimum and maximum DI benefits, particularly for long UI spell durations, as well as lower activation requirements and reduced sanctions within the DI program.

The presence of substitution effects between social insurance programs holds significant implications for determining optimal UI benefits, as emphasized by several authors (e.g., Lawson 2015, Inderbitzin et al. 2016). Lawson (2015) estimates the value of optimal UI benefits in the US using a sufficient statistics approach, where the Baily-Chetty formula is augmented by taking into account the fiscal externalities of lowering UI benefits and DI costs. The author finds that optimal UI benefits would be 50% higher than their current level.[76]

Moreover, standard job search theory suggests that reducing the gap between UI and DI benefits could positively impact job search efforts by DI recipients. Assuming that DI recipients actively engage in job search efforts, higher UI benefits are likely to increase the discounted value of employment relative to DI, as individuals expect higher replacement benefits in case of future layoffs.[77] These arguments align with other arguments developed recently by economists to make UI benefits constant or even slightly increasing along the unemployment spell (e.g., Spinnewijn 2015, Kolsrud et al. 2018).

Relatedly, addressing the high DI recipiency rates is closely connected to the broader challenge of fostering employment opportunities for individuals who face greater barriers in

[76] In contrast, for Austria, Inderbitzin et al. (2016) show that extended UI benefits and DI benefits have been complementary in the sense that older workers tended to use a combination of these two programs as an early retirement strategy. The authors conclude that these complementarities between the two programs provide an additional argument for the government to roll back the extended UI program.

[77] Note that the same logic applies to DI recipients' involvement in job training programs. Under the actual law, participation in a job training program increases the risk of being excluded from DI after some months, since the advisory doctor can consider individuals who participated in a training program to have regained sufficient ability to work. Under the current legislation, this risk constitutes a strong disincentive for DI recipients to participate in job training programs.

the labor market and supporting employment for those who are on the verge of leaving the labor market. This is particularly relevant for workers above the age of 50 (particularly those in low-paid occupations), as they have accounted a significant portion of the increase in DI recipients. Policymakers should thus reflect on how to improve labor market prospects for this group of workers.

As we described in Section 0, reforms implemented over the last 20 years within the Belgian social security have mostly focused on the supply side of the labor market, i.e., by tightening access to the different early retirement plans that were set up in the 1970s and 1980s. Yet, although supply side factors have often been put forward by policymakers to explain the persistently low employment rate among older individuals in many countries, economists have emphasized that this situation is the result of an interplay between labor supply and labor demand factors (Vandenberghe 2022). In particular, Vandenberghe (2022) explains that older workers having higher unit labor costs compared to younger workers (i.e., they exhibit a lower individual productivity per unit of salary) deter firms from hiring and retaining these workers, although the mechanisms behind this are not clear-cut.[78] This negative effect of age on unit labor costs is further amplified by employers' discrimination in hiring (e.g., Burn et al. 2022) and older workers' shorter time horizon between a new hiring and the retirement date (reducing the ability to amortize the fixed costs of a hiring).

There are several labor market policies through which policymakers can stimulate employers' demand for older workers, and a comprehensive analysis of these policies goes beyond the scope of this paper. Potential options are strengthening anti-discrimination rules, introducing hiring subsidies, or implementing a system where social contributions evolve negatively with age after a certain age threshold.[79] Reducing the size of seniority pay could also be considered to address the productivity-wage gap at the end of workers' careers. However, the literature

[78] These mechanisms may relate to declines in physical or cognitive ability with age (Vandenberghe 2021), declines in individual productivity (Gabriele et al. 2018), or firms' wage-setting strategies, in which wages increase faster than individual productivity over the career as a way for employers to retain and motivate their workers (Lazear 1979).

[79] For instance, Albanese and Cockx (2019) analyze the effect of employers' subsidies on older workers' employment in Belgium. They estimate the impact of a permanent reduction in social security contributions (by approximately €400/quarter) for workers above the age of 58, enforced in Belgium in 2002. They find a positive and significant effect of this subsidy on the retention rate of these workers but only in sectors where the UCS program was widely used. The authors conclude that the wage subsidy would be cost-effective only if it was targeted at workers in the aforementioned sectors.

on imperfect labor contracts emphasizes that this may lead to efficiency losses, such as decreased worker motivation over their careers (Lazear 1979).

8. Conclusion

In this paper, we analyze the drivers behind the growth of the LT DI recipiency rate in Belgium. We find that the increase in the LT DI entry rate has been particularly strong for individuals on regular UI, suggesting that legislative changes in the UI program played a significant role in the rate's increase. Our analysis also indicates that demographic changes (population aging and changes in household composition) and the increasing participation of women and older individuals in the labor market marginally explain the rise in the LT DI entry rate between 2005q4 and 2013q4. Only 5.5% of the rate's increase can be explained by evolutions in household composition and age, gender, and labor market status.

When focusing our analysis on salaried workers, we observe that changes in demographics, basic job characteristics (i.e., NACE one-digit sector, blue-/white-collar contract, firm size, working time, daily salary), and career duration can explain 43.1% of the increase in the LT DI entry rate for men and 24.0% for women. Although these percentages are quite significant, they still indicate that most of the rate's increase has occurred within demographic and job characteristics.

Comparing our results to the vast literature exploring the causes of the increased DI recipiency rates in other developed countries strengthens the hypothesis that there is a significant overlap between UI and DI programs, particularly for individuals who are furthest removed from the labor market. Policymakers should therefore pay more attention to the substitution effects between DI and UI programs when implementing reforms into these programs. Additionally, further research is needed to shed light on the extent to which the increase in the DI recipiency rate is related to changing workplace characteristics, such as increased job strain in some sectors.

Finally, we examine possible ways to address the high rate of DI beneficiaries in Belgium, considering the existing literature on optimal DI policy. More intensive monitoring of employers' and workers' efforts to return to work (or find a job with a new employer) as well as greater financial responsibility on the part of employers in financing DI transfers, such as implementing an experience rating system, could be effective approaches. Furthermore, since

reforms within the UI program may have significant spillover effects on DI, reducing the gap between LT UI and LT DI benefits and strengthening employers' subsidies targeted at groups on the margin of exiting the labor market could help reduce the size of the Belgian DI program.

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Tables

Table 1. Evolution of the LT DI Recipiency Rate and the Employment Rate Over Time

	LT DI (%)					Employment (%)				
Age	2005	2010	2015	2020	Evolution	2005	2010	2015	2020	Evolution
Total	3.46	4.10	5.15	6.80	+3.34	62.12	62.96	62.91	64.99	+2.87
Men										
20-44	1.34	1.41	1.59	2.09	+0.75	73.71	71.43	68.87	70.49	-3.21
45-54	5.06	5.31	6.39	7.49	+2.43	77.80	78.06	76.58	76.92	-0.88
55-64	9.53	9.23	10.08	12.16	+2.64	42.15	44.88	48.69	55.97	13.82
Total	3.73	3.95	4.55	5.61	+1.88	68.87	67.68	66.47	68.69	-0.18
Women										
20-44	1.65	2.06	2.59	3.74	+2.09	64.06	65.30	64.17	64.76	+0.70
45-54	5.24	6.51	8.86	11.47	+6.23	58.06	65.25	67.88	68.60	+10.54
55-64	5.22	7.41	10.26	14.69	+9.47	25.36	31.17	37.82	45.72	+20.36
Total	3.18	4.26	5.76	8.01	+4.83	55.27	58.18	59.32	61.25	+5.98

Notes: This table displays the evolution of the LT DI recipiency rate and the employment rate between 2005 and 2020, by gender and age category. The LT DI recipiency rate (in each gender-age cell) is defined as the sum of all individuals registered in LT DI, divided by the number of individuals residing in Belgium, on December 31 of each year. The employment rate (in each gender-age cell) is defined as the sum of all salaried and self-employed individuals (minus those who are simultaneously observed on LT DI), divided by the number of individuals in each gender-age cell, on December 31 of each year. Data source: CBSS Datawharehouse online.

Table 2. LT DI recipiency Rate by Labor Market Status and Job Characteristics

	(1) LT DI Rate (%)	(2) Share among LT DI recipients (%)
Total Population (20-64)		
Labor Market Status		
Salaried worker	6.0	57.0
Self-employed worker	3.5	7.1
Civil-servant	0.1	0.1
Unemployed jobseeker	20.2	28.9
Other	3.7	6.9
Number of LT DI recipients	301,254	
Salaried Workers		
NACE 1-Digit Sector		
Agriculture, forestry and fishing, Mining and quarrying (NACE A-B)	7.0	0.5
Manufacturing (NACE C)	5.6	12.7
Electricity, gas, steam and air conditioning supply (NACE D)	2.1	0.2
Water supply; sewerage; waste management and remediation activities (NACE E)	5.3	0.5
Construction (NACE F)	8.6	8.7
Wholesale and retail trade; repair of motor vehicles and motorcycles (NACE G)	5.1	12.8
Transportation and storage (NACE H)	5.9	5.2
Accommodation and food service activities (NACE I)	7.1	3.8
Information and communication (NACE J)	1.9	0.9
Financial and insurance activities (NACE K)	3.6	2.2
Real estate activities (NACE L)	5.7	0.6
Professional, scientific and technical activities (NACE M)	2.4	1.9
Administrative and support service activities (NACE N)	7.5	14.9
Public administration and defense; compulsory social security (NACE O)	7.0	9.0
Education (NACE P)	3.4	2.7
Human health and social work activities (NACE Q)	8.2	20.1
Arts, entertainment and recreation (NACE R)	4.2	0.7
Other service activities (NACE S)	5.7	2.0
Activities of households as employers (…) (NACE T)	7.0	0.1
Activities of extraterritorial organizations and bodies (NACE U)	3.3	0.1
Joint Commission (10 most represented)		
Interim work (n. 322)	9	10.5
health facilities and services (n. 330)	6.1	7.2
Construction (n. 124)	10.5	7
No joint-committee (n. 999)	3.6	3.9
Metallic, mechanical and electrical activities (n. 111)	7.5	3.8
Adapted work (n. 327)	23	3.7
Hotels and restaurants (n. 302)	7.4	3.7
Joint Committee for Employees (n. 200)	1.8	3.6
Transport and logistic (n. 140)	8.6	3.1
Cleaning (n. 121)	14.4	2.6

(Table continued)

Occupation		
White collar	3.8	37.6
Blue collar	9.3	62.0
Firm size		
1-19 Workers	6.3	23.1
20-99 Workers	6.3	20.5
100-499 Workers	6.3	21.6
500+ Workers	5.6	34.4

Daily wage		
Quartile 1	7.6	38.1
Quartile 2	5.8	22.4
Quartile 3	6.1	24.2
Quartile 4	3.1	13.8
Number of formerly salaried LT DI recipients	171,673	
Unemployed Workers		
Unemployment duration		
1-11 months	17.5	13.3
12+ months	20.7	86.7
Number of formerly unemployed LT DI recipients	87,041	

Notes: This table displays descriptive statistics on LT DI recipiency rates by labor market position and job characteristics in 2015q4. The data cover all individuals aged 20–64 residing in Belgium in 2015. Since the data do not provide information before 2003q1, we drop all DI recipients who were already on DI in 2003q1. For those who entered into DI after 2003q1, we recover their last labor market position, job characteristics (for formerly salaried workers), and unemployment duration (for formerly unemployed workers) before primary incapacity. Column (1) displays the DI rate by category, i.e., the number of DI recipients observed in a given category before entry into primary incapacity, divided by the total number of individuals observed in this category (including DI recipients) in 2015q4. Column (2) displays the share of DI recipients who was observed in a given category before entry into DI. Data source: CBSS Datawarehouse.

Table 3. Aggregate Health Indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total	Women	Men	<25 y.o.	25-49 y.o.	50-64 y.o.	>64 y.o.	1st Rev. Quintile	2nd Rev. Quintile	3rd Rev. Quintile	4th Rev. Quintile	5th Rev. Quintile
Perceived bad health (%)												
2005	8.27	9.67	6.79	1.69	4.86	11.43	17.02	15.73	12.12	6.75	4.26	2.82
2021	7.9	8.9	6.9	1.7	4.6	10.5	14.3	15.9	11.2	5.9	3.9	3.0
Long-standing health problem (%)												
2005	25.07	27.28	22.73	9.47	17.41	31.42	46.11	34.87	31.72	24.28	18.79	16.16
2021	25.0	26.5	23.5	8.7	17.4	31.1	40.0	37.5	31.1	24.1	18.3	14.3
Long-standing limitations in usual activities (%)				<25	25-54	55-64	>64					
2008	6.9	7.7	6.0	1.6	4.7	8.6	14.8	12.0	9.9	6,4	3.6	2.7
2021	8.3	9.3	7.2	2	5.9	10.9	14.4	14.6	12.1	7.4	4.7	2.7
Psychological Distress (%)				15-34	35-54	55-64	>64					
2004	12.7	15.3	9.8	12.5	14.45	9.6	11.95	16.6	15.7	11.4	11.8	11.3
2018	17.7	21.1	14.0	18.85	19.8	16.0	14.4	26.3	20.3	19.5	16.2	13.2
Depression (%)												
2004	5.9	7.1	4.6	n.a	n.a	n.a	n.a	8.1	9.5	6.2	4.3	3.6
2018	7.4	9.1	5.5	n.a	n.a	n.a	n.a	14.9	10.2	7.5	6.9	3.9

Notes: This table provides descriptive statistics on various health indicators in 2005 and 2021 (or 2004–2018, depending on data availability). The data have been collected by the Federal Planning Bureau, from Eurostat and the Belgian Health Interview Survey. "Perceived bad health" gives the result of a questionnaire in which individuals evaluated their health as "bad" or "very bad" on a scale containing the following answers: "very good," "good," "medium," "bad," and "very bad." "Long-standing health problem" indicates whether an individual has a health problem that has lasted or is likely to last for at least 6 months. "Long-standing limitations in usual activities" is the result of an interview where individuals answered being "seriously limited" in their daily activities due to a long-standing health limitation, on a scale containing the following answers: "not limited at all," "limited but not severely," and "severely limited." "Psychological distress" gives the share of individuals who have a GHQ-12 score of 4 or more (on a scale ranging from 0 to 12). "Depression" gives the share of individuals who experienced a depression over the last 12 months. Data source: https://indicators.be/.

Table 4. Descriptive Statistics: Population Aged 20–64

	(1) 2005q4	(2) 2013q4	(3) Difference
P(LT DI)	0.7%	1.2%	0.5%
P(LT DI mental)	0.2%	0.4%	0.2%
P(LT DI musculo.)	0.2%	0.4%	0.2%
P(LT DI other)	0.4%	0.5%	0.1%
Household Type			
Couple without children	21.7%	21.1%	-0.6%
Couple with children	41.9%	40.5%	-1.4%
Single without children	14.1%	14.8%	0.7%
Single with children	5.6%	5.7%	0.1%
Other	16.7%	18.0%	1.3%
Gender			
Woman	50.2%	49.4%	-0.8%
Age Category			
20-24	11.0%	11.2%	0.2%
25-29	11.2%	11.0%	-0.2%
30-34	11.7%	11.3%	-0.4%
35-39	12.7%	11.1%	-1.6%
40-44	13.3%	11.8%	-1.5%
45-49	12.4%	12.0%	-0.4%
50-54	10.8%	11.7%	0.9%
55-59	9.8%	10.5%	0.7%
60-64	7.1%	9.4%	2.3%
Labor Market Status			
Salaried	45.4%	46.4%	1.0%
Self-Employed	10.2%	10.4%	0.2%
Civil Servant	10.0%	9.0%	-1.0%
Regular UI	7.3%	6.7%	-0.6%
Old-age UI / UCS	8.2%	7.7%	-0.5%
Welfare Benefits	1.0%	1.4%	0.4%
Family allowances	3.1%	4.2%	1.1%
Handicap benefits	0.6%	0.9%	0.3%
Other	14.2%	13.3%	-0.9%
# Individuals	5,681,793	6,099,537	

Notes: This table provides descriptive statistics about the population in December 31 of the years 2005 and 2013, For each period, the sample contains all individuals residing in Belgium who are not observed in ST or LT DI. Data source: CBSS Datawarehouse.

Table 5. Descriptive Statistics: Salaried Workers Aged 20–64

	(1)	(2)	(3)		(1)	(2)	(3)
					(Table Continued)		
	2005q4	2013q4	Difference		2005q4	2013q4	Difference
P(LT DI)	0.9%	1.4%	0.5%	NACE S	2.0%	2.3%	0.3%
P(LT DI mental)	0.2%	0.4%	0.2%	NACE T	0.1%	0.1%	0.0%
P (LT DI musculo.)	0.3%	0.5%	0.2%	NACE U	0.1%	0.1%	0.0%
P(LT DI other)	0.5%	0.6%	0.1%	Occupation			
Household Type				Blue-Collar	40.9%	38.8%	-2.1%
Couple no children	19.2%	19.5%	0.3%	Firm Size			
Couple with children	45.5%	45.4%	-0.1%	1-19	24.6%	22.5%	-2.1%
Single no children	13.1%	13.7%	0.6%	20-99	20.4%	20.4%	0.0%
Single with children	5.0%	5.8%	0.8%	100-499	19.3%	20.5%	1.2%
Other	17.2%	15.6%	-1.6%	500+	35.7%	36.6%	0.9%
Gender				Work.Time (%FTE)			
Woman	46.0%	48.1%	2.1%	0-19%	2.4%	2.0%	-0.4%
Age Category				20-39%	3.5%	3.3%	-0.2%
20-24	10.7%	8.6%	-2.1%	40-59%	10.9%	10.9%	0.0%
25-29	15.6%	14.2%	-1.4%	60-79%	9.4%	10.3%	0.9%
30-34	15.1%	14.1%	-1.0%	80-99%	26.1%	26.0%	-0.1%
35-39	15.6%	13.2%	-2.4%	100%	47.7%	47.5%	-0.2%
40-44	15.3%	13.8%	-1.5%	Daily Salary			
45-49	12.5%	13.8%	1.3%	Daily Salary	€132.6	€133.3	+€0.7
50-54	9.1%	12.0%	2.9%	Contribution Years			
55-59	5.0%	7.8%	2.8%	0-4	28.8%	24.8%	-4.0%
60-64	1.1%	2.5%	1.4%	5-9	22.4%	19.4%	-3.0%
NACE Sector				10-14	17.0%	17.6%	0.6%
NACE A-B	1.3%	0.5%	-0.8%	15-19	12.4%	13.9%	1.5%
NACE C	19.2%	14.8%	-4.4%	20-24	8.7%	10.9%	2.2%
NACE D	0.5%	0.6%	0.1%	25-29	6.3%	7.3%	1.0%
NACE E	0.4%	0.6%	0.2%	30-35	3.5%	4.3%	0.8%
NACE F	6.3%	6.3%	0.0%	35+	1.0%	1.7%	0.7%
NACE G	15.6%	15.4%	-0.2%				
NACE H	5.1%	4.9%	-0.2%				
NACE I	3.3%	3.2%	-0.1%				
NACE J	3.2%	3.0%	-0.2%				
NACE K	5.4%	4.3%	-1.1%				
NACE L	0.6%	0.6%	0.0%				
NACE M	4.0%	4.9%	0.9%				
NACE N	6.6%	10.1%	3.5%				
NACE O	7.5%	7.8%	0.3%				
NACE P	5.3%	5.3%	0.0%				
NACE Q	12.9%	14.3%	1.4%				
NACE R	0.7%	1.0%	0.3%				
# Individuals	2,469,813	2,692,714					

Notes: This table provides descriptive statistics about the population of salaried individuals aged 20–64 in December 31 of the years 2005 and 2013. For each period, the sample contains all salaried workers residing in Belgium who are not observed in ST or LT DI. Those with a missing job characteristic are dropped from the sample. Data source: CBSS Datawarehouse.

Table 6. Estimated LT DI Entry Rates from a Logistic Regression: Population Aged 20–64

	(1)	(2)	(3)	(4)	(5)
	2005q4		2013q4		Evolution
VARIABLES	Coef.	(SE)	Coef.	(SE)	(4)-(1)
Household Type					
Couple without Children	0.00404	(6.57e-05)	0.00591	(8.02e-05)	0.00187
Couple with children	0.00373	(5.25e-05)	0.00555	(6.63e-05)	0.00182
Single without children	0.00541	(8.75e-05)	0.00763	(0.000102)	0.00222
Single with children	0.00622	(0.000120)	0.00937	(0.000144)	0.00315
Other	0.00435	(8.31e-05)	0.00627	(9.55e-05)	0.00192
Gender					
Man	0.00400	(5.41e-05)	0.00544	(6.30e-05)	0.00144
Woman	0.00445	(5.92e-05)	0.00711	(7.99e-05)	0.00266
Age Category					
20-24	0.00163	(4.62e-05)	0.00249	(5.77e-05)	0.00086
25-29	0.00248	(5.32e-05)	0.00375	(6.53e-05)	0.00127
30-34	0.00373	(6.99e-05)	0.00654	(9.73e-05)	0.00281
35-39	0.00490	(8.44e-05)	0.00860	(0.000122)	0.00370
40-44	0.00559	(9.30e-05)	0.00791	(0.000113)	0.00232
45-49	0.00652	(0.000107)	0.00946	(0.000130)	0.00294
50-54	0.00693	(0.000116)	0.01020	(0.000138)	0.00327
55-59	0.00668	(0.000126)	0.00834	(0.000123)	0.00166
60-64	0.00273	(9.47e-05)	0.00355	(8.74e-05)	0.00082
Labor Market Status					
Salaried	0.00810	(5.93e-05)	0.0120	(6.87e-05)	0.00390
Self-Employed	0.00574	(9.37e-05)	0.00672	(9.71e-05)	0.00098
Civil Servant	0.00013	(1.29e-05)	0.00017	(1.53e-05)	0.00005
Regular UI	0.02020	(0.000220)	0.03740	(0.000299)	0.01720
Old-age UI / UCS	0.00282	(7.99e-05)	0.00470	(0.000115)	0.00188
Welfare Benefits	0.00297	(0.000204)	0.00308	(0.000172)	0.00011
Family allowances	0.00053	(8.21e-05)	0.00045	(6.35e-05)	-0.00008
Handicap benefits	0.00264	(0.000245)	0.00885	(0.000362)	0.00621
Other	0.00455	(7.30e-05)	0.00743	(9.27e-05)	0.00288
# Individuals	5,681,793		6,099,537		

Notes: This table displays the results of a logistic regression, in which we regress a dummy for entering LT DI on a set of personal characteristics. Each coefficient displays the estimated LT DI entry rate for a given category, with standard deviations in parentheses. The regression includes all individuals residing in Belgium and aged 20–64 at reference periods 2005q4 and 2013q4. The dependent variable is a dummy equal to one if an individual has received at least one LT DI payment over the period considered (2006–2007 and 2014–2015, respectively). Data source: CBSS Datawarehouse.

Table 7. Estimated LT DI Entry Rates from a Logistic Regression: Salaried Workers Aged 20–64

	(1)	(2)	(3)	(4)	(5)
	2005q4		2013q4		Evolution
VARIABLES	Coef.	(SE)	Coef.	(SE)	(4)-(1)
Household Type					
Couple no child.	0.00562	(9.88e-05)	0.00937	(0.000124)	0.00375
Couple with child.	0.00503	(6.53e-05)	0.00868	(8.35e-05)	0.00365
Single no child.	0.00698	(0.000130)	0.0108	(0.000153)	0.00382
Single with child.	0.00650	(0.000169)	0.0112	(0.000203)	0.0047
Other	0.00521	(0.000122)	0.00894	(0.000161)	0.00373
Gender					
Man	0.00537	(6.85e-05)	0.00850	(8.38e-05)	0.00313
Woman	0.00558	(7.55e-05)	0.0101	(9.84e-05)	0.00452
Age Category					
20-24	0.00143	(5.98e-05)	0.00239	(8.26e-05)	0.00096
25-29	0.00256	(7.31e-05)	0.00421	(9.36e-05)	0.00165
30-34	0.00428	(9.92e-05)	0.00725	(0.000126)	0.00297
35-39	0.00608	(0.000123)	0.0104	(0.000163)	0.00432
40-44	0.00813	(0.000151)	0.0114	(0.000173)	0.00327
45-49	0.0105	(0.000202)	0.0147	(0.000207)	0.0042
50-54	0.0137	(0.000294)	0.0183	(0.000266)	0.0046
55-59	0.0148	(0.000409)	0.0210	(0.000376)	0.0062
60-64	0.00759	(0.000441)	0.0125	(0.000413)	0.00491
NACE 1-Digit					
NACE A-B	0.00347	(0.000249)	0.00562	(0.000481)	0.00215
NACE C	0.00545	(0.000102)	0.00896	(0.000146)	0.00351
NACE D	0.00695	(0.00102)	0.00813	(0.000920)	0.00118
NACE E	0.00717	(0.000724)	0.0107	(0.000701)	0.00353
NACE F	0.00939	(0.000230)	0.0138	(0.000281)	0.00441
NACE G	0.00556	(0.000113)	0.00980	(0.000150)	0.00424
NACE H	0.00566	(0.000174)	0.00990	(0.000239)	0.00424
NACE I	0.00306	(0.000125)	0.00620	(0.000189)	0.00314
NACE J	0.00493	(0.000298)	0.00781	(0.000379)	0.00288
NACE K	0.00621	(0.000244)	0.00998	(0.000341)	0.00377
NACE L	0.00377	(0.000355)	0.00728	(0.000535)	0.00351
NACE M	0.00507	(0.000228)	0.00800	(0.000279)	0.00293
NACE N	0.00546	(0.000142)	0.00921	(0.000151)	0.00375
NACE O	0.00482	(0.000123)	0.00871	(0.000165)	0.00389
NACE P	0.00348	(0.000146)	0.00543	(0.000178)	0.00195
NACE Q	0.00685	(0.000130)	0.0116	(0.000158)	0.00475
NACE R	0.00394	(0.000378)	0.00672	(0.000435)	0.00278
# Individuals	2,469,812		2,692,714		

(Table Continued)

	(1)	(2)	(3)	(4)	(5)
	2005q4		2013q4		Evolution
	Coef.	(SE)	Coef.	(SE)	(4)-(1)
NACE S	0.00399	(0.000216)	0.00861	(0.000301)	0.00462
NACE T	0.00368	(0.000791)	0.00516	(0.001000)	0.00148
NACE U	0.00166	(0.000742)	0.00520	(0.00135)	0.00354
Occupation					
Blue-Collar	0.00660	(9.02e-05)	0.0112	(0.000118)	0.0046
White-Collar	0.00480	(6.01e-05)	0.00820	(7.46e-05)	0.0034
Firm Size					
1-19	0.00453	(7.75e-05)	0.00808	(0.000108)	0.00355
20-99	0.00553	(9.22e-05)	0.00940	(0.000117)	0.00387
100-499	0.00594	(0.000102)	0.00983	(0.000122)	0.00389
500+	0.00591	(8.28e-05)	0.00965	(0.000100)	0.00374
Wk.Time (%FTE)					
0-19%	0.0212	(0.000556)	0.0379	(0.000772)	0.0167
20-39%	0.00867	(0.000262)	0.0162	(0.000357)	0.00753
40-59%	0.00725	(0.000142)	0.0126	(0.000182)	0.00535
60-79%	0.00736	(0.000151)	0.0128	(0.000188)	0.00544
80-99%	0.00596	(8.93e-05)	0.0104	(0.000115)	0.00444
100%	0.00417	(6.00e-05)	0.00683	(7.51e-05)	0.00266
Contribution Years					
0-4	0.00590	(0.000109)	0.0100	(0.000144)	0.0041
5-9	0.00588	(0.000103)	0.0107	(0.000143)	0.00482
10-14	0.00520	(9.91e-05)	0.00933	(0.000129)	0.00413
15-19	0.00512	(0.000108)	0.00872	(0.000134)	0.0036
20-24	0.00500	(0.000121)	0.00833	(0.000143)	0.00333
25-29	0.00505	(0.000142)	0.00816	(0.000167)	0.00311
30-35	0.00460	(0.000176)	0.00720	(0.000199)	0.0026
35+	0.00394	(0.000297)	0.00529	(0.000270)	0.00135

Notes: This table displays the results of a logistic regression, in which we regress a dummy for entering LT DI on a set of individual characteristics. Each coefficient displays the estimated LT DI entry rate for a given category, with standard deviations in parentheses. The regression includes all salaried workers residing in Belgium and aged 20–64 at reference periods 2005q4 and 2013q4. The dependent variable is a dummy equal to one if an individual has received at least one LT DI payment over the period considered (2006–2007 and 2014–2015, respectively). Data source: CBSS Datawarehouse.

Table 8. Fairlie Decomposition: Population Aged 20–64

	(1)	(2)	(3)
P(LT DI Entry) 2005q4	0.00748	(N = 5,681,793)	
P(LT DI Entry) 2013q4	0.01189	(N = 6,099,537)	
Difference	0.00440		
% Explained Difference	5.5%		
Variable	Coefficient	SE	% Explained Contribution
Household	1.84E-05	(0.000000)	7.7%
Labor Market Status*Gender*Age	0.00022	(0.000000)	92.3%
Total Explained	0.00024		100%

Notes: This table displays the results of a Fairlie decomposition, where the dependent variable is a dummy equal to one if an individual has received at least one LT DI transfer over a given period (2006–2007 or 2014–2015). Variables included in the regression are household type (5 dummies) and an interaction between labor market status, gender, and age (9*2*9 = 162 dummies). The population included in the analysis contains all individuals residing in Belgium and aged 20–64 at the reference periods (2005q4 and 2013q4). Data source: CBSS Datawarehouse.

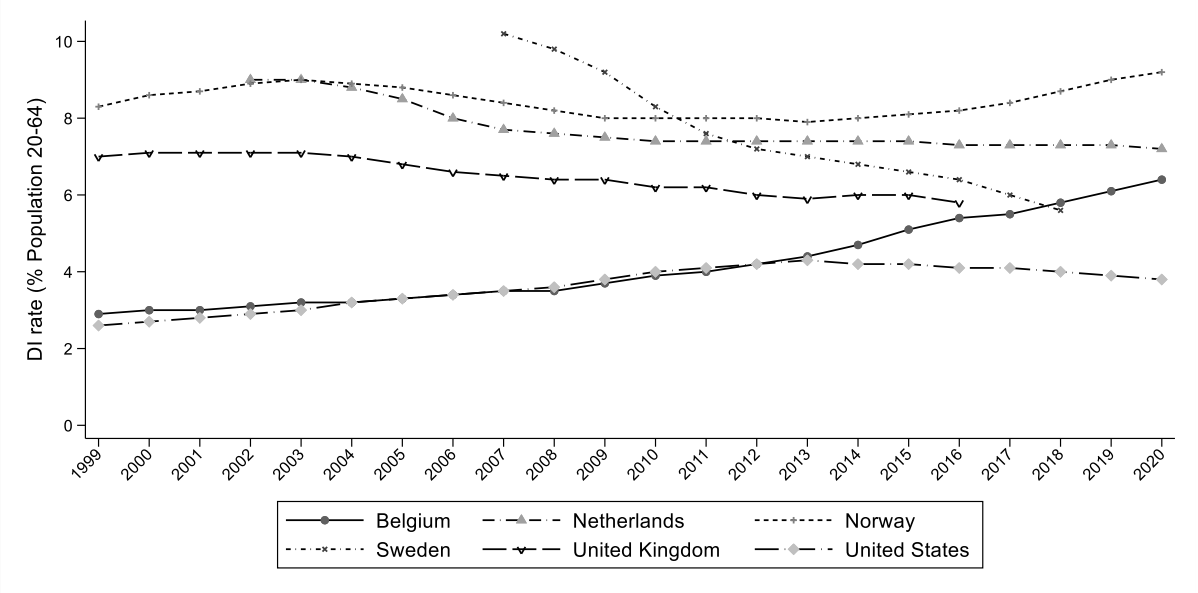
Table 9. Fairlie Decomposition: Salaried Workers Aged 20–64

	(1)	(2)	(3)
P(LT DI Entry) 2005q4	0.00873	(N = 2,469,812)	
P(LT DI Entry) 2013q4	0.01394	(N = 2,692,714)	
Difference	0.00521		
% Explained Difference	16.2%		
Variable	Coefficient	SE	% Explained Contribution
Gender	0.00000	(0.000000)	0.0%
Household	0.00006	(0.000000)	6.8%
Age	0.00088	(0.000000)	104.2%
NACE 1-Digit Sector	0.00001	(0.000000)	1.3%
White/Blue Collar Contract	-0.00005	(0.000000)	-5.6%
Firm Size	0.00008	(0.000000)	9.8%
Working Hours (%FTE)	-0.00012	(0.000000)	-14.7%
Daily Salary	0.00004	(0.000000)	4.9%
Career Length	-0.00006	(0.000000)	-6.6%
Total Explained	0.000840		100.0%

Notes: This table displays the results of a Fairlie decomposition, where the dependent variable is a dummy equal to one if an individual has received at least one LT DI transfer over a given period (2006–2007 or 2014–2015). The regression includes all individuals who were registered in a salaried employment at the start of each period (2005q4 and 2013q4) and who were not simultaneously on ST/LT DI. The following variables are included in the regression: female gender (0/1), household status (5 dummies), age (9 dummies), NACE one-digit sector (20 dummies), blue-collar occupation (0/1), firm size (4 dummies), career length (8 dummies), full-time share (6 dummies), and daily salary (in 2013 euros).

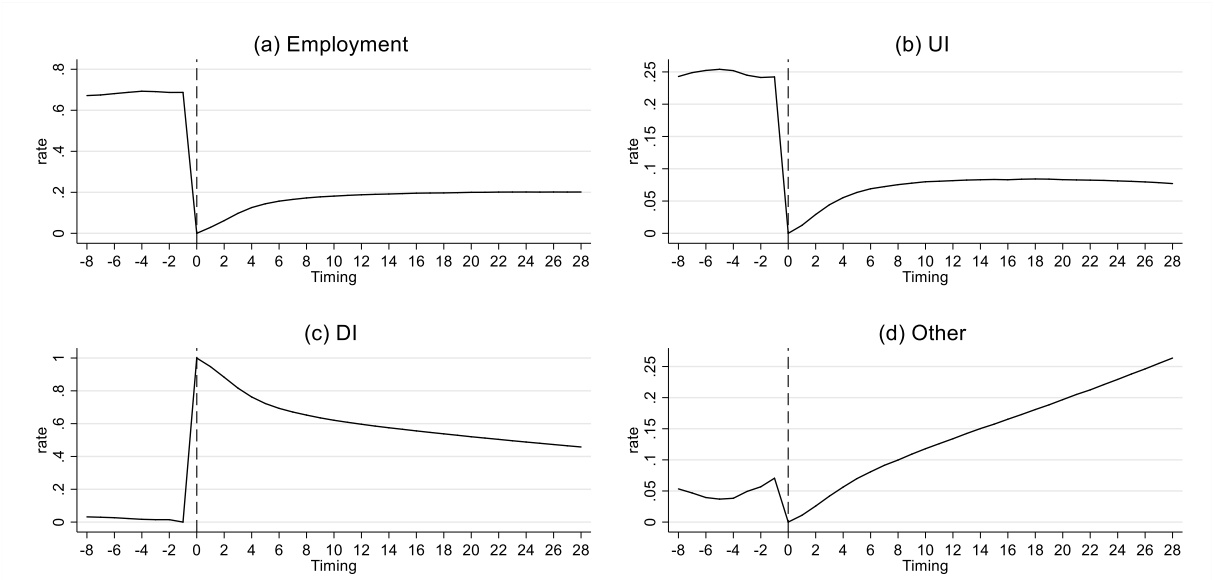
Figures

Figure 1. Evolution of DI Recipiency Rates in Six OECD Countries



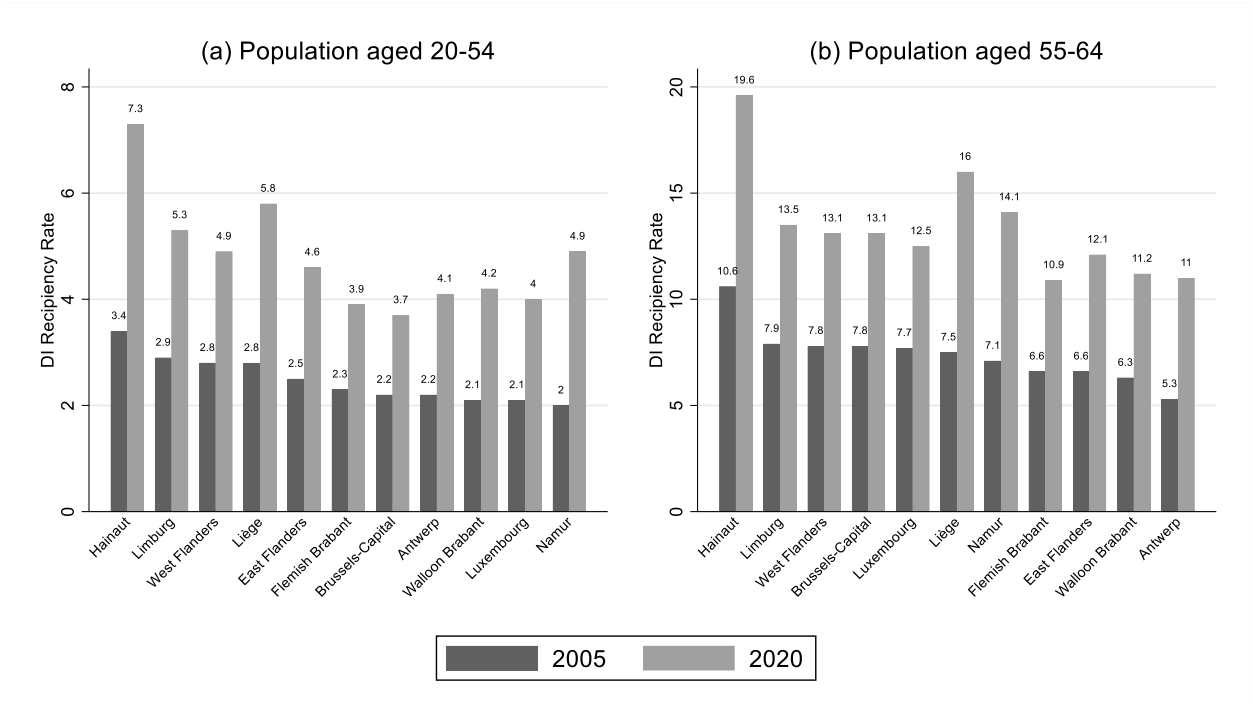
Notes: This figure displays the long-term DI recipiency rate (number of long-term DI recipients over total population aged 20–64) in Belgium and in seven other developed countries. Data sources: the Norwegian Labour and Welfare Administration for Norway, the Department for Work and Pensions (DWP) for the UK, the US Social Security Agency for the US, the Centraal Bureau voor de Statistiek for the Netherlands, and OECD.Stat for Sweden.

Figure 2. Event-Study Analysis



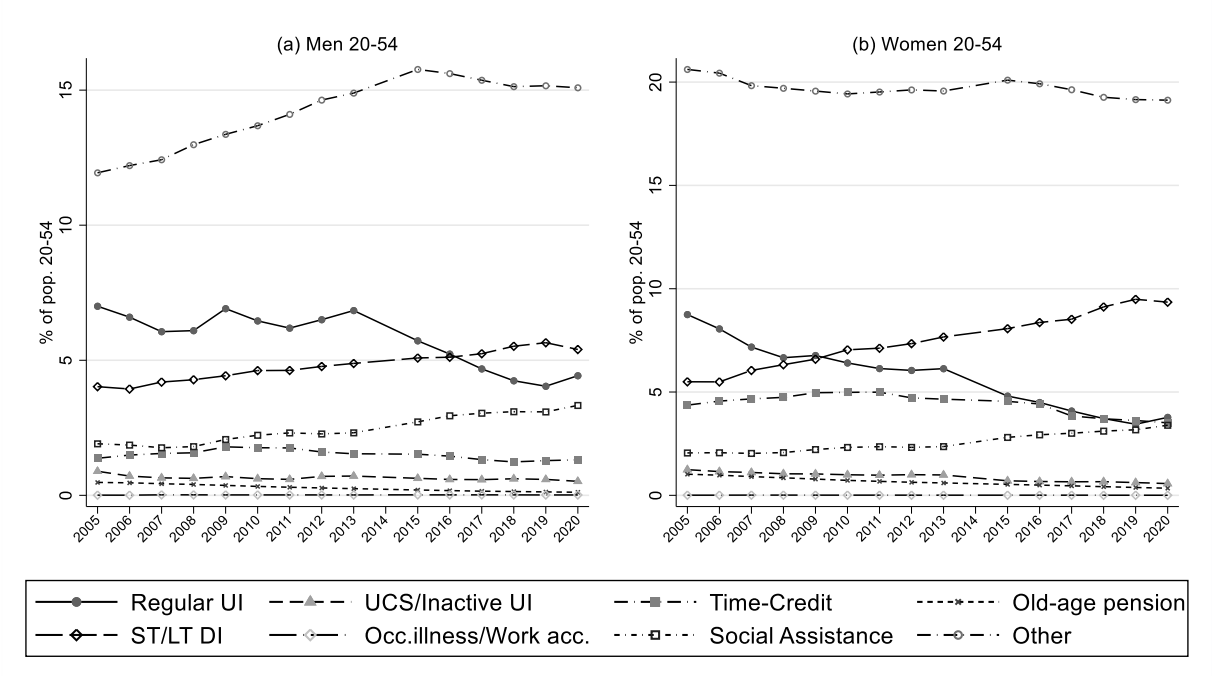
Notes: This figure provides an event-study analysis for all individuals who entered LT DI between 2005q1 and 2008q4. Each panel displays the share of individuals observed in a given state from 8 quarters before to 28 quarters after DI entry. Panel (a) shows the share of individuals observed on employment (salaried, self-employed, or civil servant), and panel (b) shows the share of individuals observed on regular/old-age UI. Panel (c) displays the share of individuals observed on DI, while panel (d) displays the share of individuals who are observed in a state other than employment, UI, or DI. Data source: CBSS Datawarehouse.

Figure 3. DI Recipiency Rates by Province



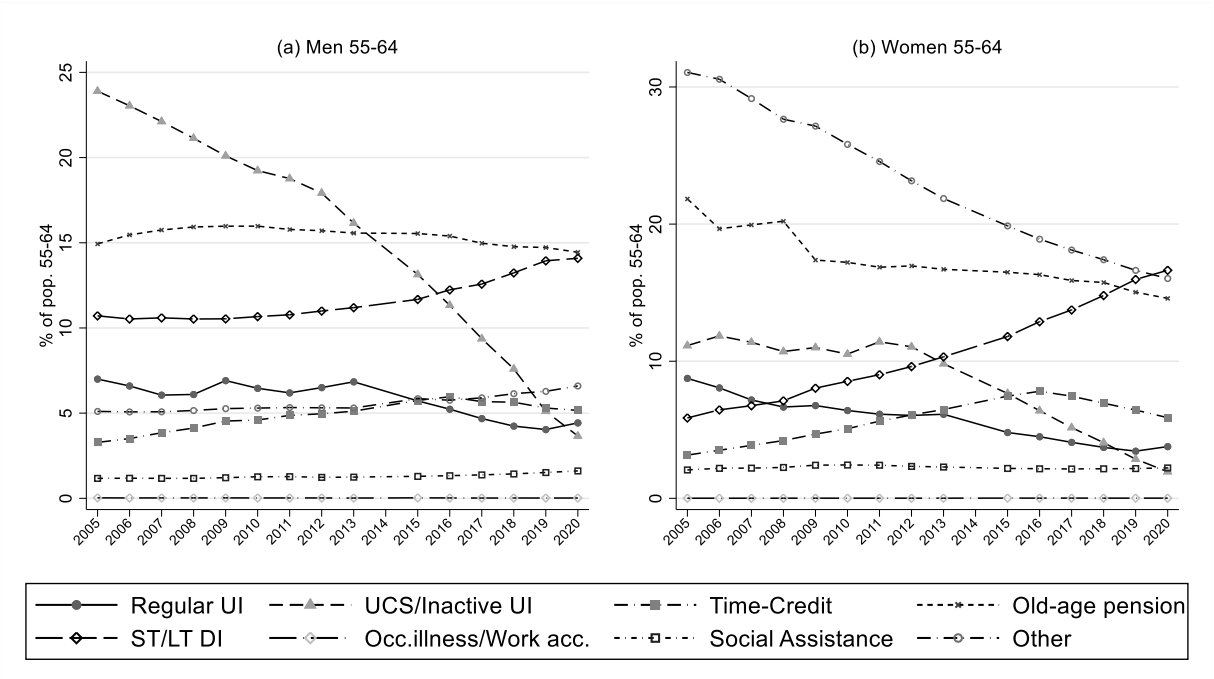
Notes: This figure displays local LT DI recipiency rates on December 31 of years 2005 and 2020, by province, respectively, for individuals aged 20–54 (panel (a)) and 55–64 (panel (b)). Data source: CBSS Datawarehouse online.

Figure 4. Participation Rates in Social Security Programs Among Individuals Aged 20–54



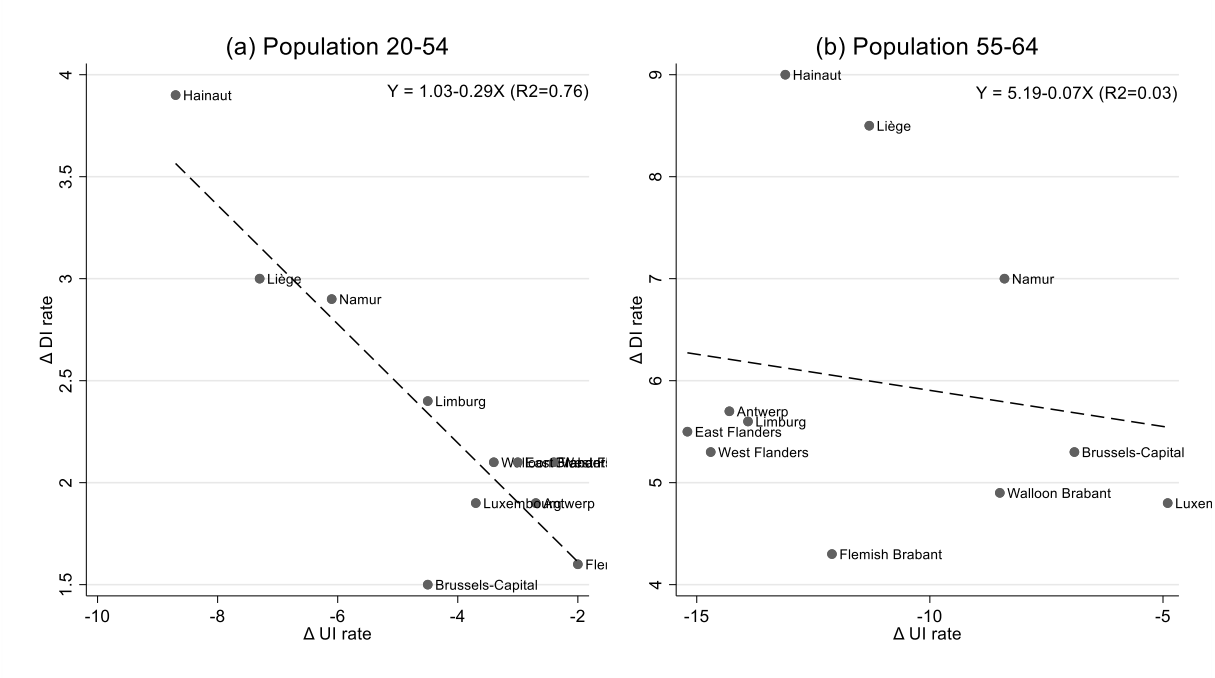
Notes: This figure displays the share of men and women aged 20–54 in all labor market positions other than employment. Panel (a) displays the shares for men, and panel (b) for women. Individuals with a missing sex or province were dropped, and all statuses are mutually exclusive. For individuals who received transfers from two or more programs at the same time, the following hierarchy has been established: DI, regular UI, Time-credit, UCS/inactive UI, Old-age pension, Social assistance, Occupational illness/Work accident and Other. inactive UI contains unemployed individuals who are exempted from being active on the labor due to old-age or any other reason (e.g. family circumstances or participation to a job training program). Social assistance contains individuals who receive welfare or handicapped benefits. Other contains all individuals who are either registered as children receiving family benefits or individuals who are neither working nor receiving any kind of social security transfers. Data source: CBSS Datawarehouse online.

Figure 5. Participation Rates in Social Security Programs Among Individuals Aged 55–64



Notes: This figure displays the share of the population aged 55–64 in all labor market positions other than employment. Panel (a) displays the shares for men and panel (b) for women. Individuals with a missing sex or province were dropped, and all statuses are mutually exclusive. For individuals who received transfers from two or more programs at the same time, the following hierarchy has been established: DI, regular UI, Time-credit, UCS/inactive UI, Old-age pension, Social assistance, Occupational illness/Work accident and Other. inactive UI contains unemployed individuals who are exempted from being active on the labor due to old-age or any other reason (e.g. family circumstances or participation to a job training program). Social assistance contains individuals who receive welfare or handicapped benefits. Other contains all individuals who are either registered as children receiving family benefits or individuals who are neither working nor receiving any kind of social security transfers. Data source: CBSS Datawarehouse online.

Figure 6. Evolution of the DI and UI Rates by Provinces (2005–2020)



Notes: This figure correlates the evolution of the LT DI and UI rates between 2005 and 2020, respectively, for individuals aged 20–54 (panel (a)) and 55–64 (panel (b)). The UI rate computed in this figure includes both regular UI and old-age UI/UCS. Equations on the top right of each panel display the estimated coefficients and the R-squared, of a first-difference regression of the LT DI rate on the UI rate. Data source: CBSS Datawarehouse online.

Appendix

A. 1. Computation of DI benefits

Table A. 1. Computation of DI benefits

	Salaried regime			Self-employed regime
	Blue-collars	White-collars	Unemployed	
1 - 7 days	100%	100%	min(UI benefits ; 60%)	Forfetary amount
8 - 29 days	85.88%	100%	idem	idem
30 days - 6 months	60%	60%	idem	idem
6 months - 1 year	60%	60%	60%	idem
> 1 year	65% (single income household), 55% (single person household), 40% (dual income household)			idem

Notes: The table indicates the amount of replacement benefits, computed in percentages of the last monthly gross salary. All benefits are subject to caps and floors. In the salaried regime, the household status plays no role during the first four months of sickness absence. From the fourth month of sickness absence, the household status determines the maximum and minimum amount of the benefits. For blue-collar workers, the employer pays 85.88% of the wage between day 8 and day 14 of the sickness absence. Between day 15 and day 29, the employer pays 25.88% of the wage and the NIHDI pays the remaining 60%. In the event of a relapse within 14 days of resuming activity after a period of primary incapacity, the amount of benefits is calculated as if the worker had not returned to work. Work injuries and occupational diseases are subject to a separate regime with distinct benefit computation rules. Source: NIHDI.

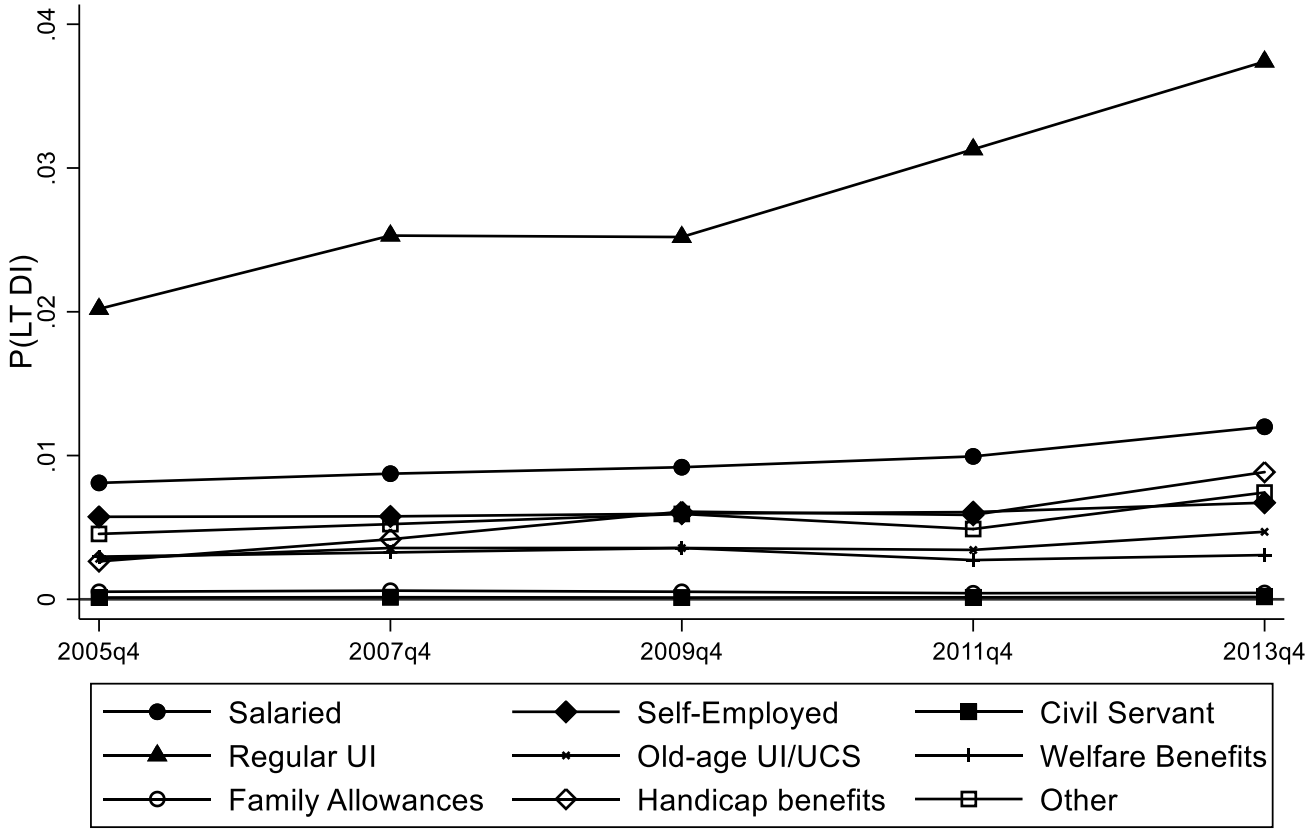
Table A. 2. Comparison Between Minimum and Maximum UI and DI benefits

	Monthly UI transfers	Monthly DI transfers	
	Fixed amount	Floor	Cap
Single income household	1,650.22	1900.6	2884.7
Single person household	1,337.18	1513.46	2440.88
Dual income household	693.94	1297.66	1775.28

Notes: These numbers display the value of monthly UI benefits in Belgium after an unemployment duration of 49 months and the value of monthly DI benefits after a duration of seven months for the year 2023. Sources: Federal Employment Agency and NIHDI.

A. 2. Estimated LT DI Entry Rates by Labor Market Status

Figure A. 1. Estimated LT DI Entry Rate by Labor Market Status



Notes: This figure displays the estimated LT DI entry rate by labor market status and period. Each coefficient has been obtained from a logistic regression, using as outcome a dummy equal to one if an individual has been observed on LT DI over a given period (2006-2007, 2008-2009, 2010-2011, 2012-2013 and 2014-2015), while not being on ST/LT DI at each reference period (i.e., December, 31 of years 2005, 2007, 2009, 2011 and 2013). In addition to labor market status, the regression includes the following covariates: gender, household (5 dummies) and age category (9 dummies), interacted with the different periods.

A. 3. Fairlie Decomposition - Additional Results

Table A. 3. Fairlie Decomposition by Type of Diagnostic - Population aged 20-64

	(1) Mental Disorders	(2) Musculoskeletal Disorders	(3) Other Disorders
P(LT DI Entry) 2005q4	0.00199	0.00208	0.00416
P(LT DI Entry) 2013q4	0.00352	0.00354	0.00489
Difference	0.00153	0.00146	0.00074
% Explained Difference	-3.0%	9.2%	19.9%

Notes: This table displays the results of Fairlie decompositions, where the dependent variables are dummies equal to one if an individual has received at least one LT DI transfer over a given period (2006-2007 or 2014-2015), respectively for mental disorders (column 1), musculoskeletal disorders (column 2) and other disorders (column 3). Variables included in the regression are: household (5 dummies) and an interaction between labor market status, gender and age (162 dummies). The population included in the regressions contains all individuals residing in Belgium and aged 20-64 at the reference periods (2005q4 and 2013q4). Data source: CBSS Datawarehouse.

Table A. 4. Fairlie Decomposition by Gender - Population aged 20-64

	(1) Men	(2) Women
P(LT DI Entry) 2005q4	0.00699	0.00798
P(LT DI Entry) 2013q4	0.01034	0.01347
Difference	0.00335	0.00550
% Explained Difference	15.0%	0.1%

Notes: This table displays the results of Fairlie decompositions for men (column 1) and women (column 2), where the dependent variables are dummies equal to one if an individual has received at least one LT DI transfer over a given period (2006-2007 or 2014-2015). Variables included in the regression are: household (5 dummies) and an interaction between labor market status and age (81 dummies). The population included in the regressions contains all individuals residing in Belgium and aged 20-64 at the reference periods (2005q4 and 2013q4). Data source: CBSS Datawarehouse.

Table A. 5. Fairlie Decomposition by Type of Diagnostic - Salaried Workers Aged 20-64

	(1) Mental Disorders	(2) Musculoskeletal Disorders	(3) Other Disorders
P(LT DI Entry) 2005q4	0.00212	0.00277	0.00462
P(LT DI Entry) 2013q4	0.00366	0.00467	0.00567

Difference	0.00154	0.00191	0.00105
% Explained Difference	10.7%	18.2%	32.1%

Notes: This table displays the results of Fairlie decompositions, where the dependent variables are dummies equal to one if an individual has received at least one LT DI transfer over a given period (2006-2007 or 2014-2015), respectively for mental disorders (column 1), musculoskeletal disorders (column 2) and other disorders (column 3). The population included in the regressions contains all salaried workers residing in Belgium and aged 20-64 at the reference periods (2005q4 and 2013q4). Variables included in the regression are: a dummy for female (0/1), household (5 dummies), age category (9 dummies), NACE 1-digit sector, firm size class (4 dummies), working hours class (8 dummies), daily salary (in 2013 euros) and career length (8 dummies).

Table A. 6. Fairlie Decomposition by Gender - Salaried Workers Aged 20-64

	(1) Men	(2) Women
P(LT DI Entry) 2005q4	0.00764	0.01002
P(LT DI Entry) 2013q4	0.00919	0.01376
Difference	0.00155	0.00374
% Explained Difference	43.1%	24.0%

Notes: This table displays the results of Fairlie decompositions for men (column 1) and women (column 2), where the dependent variables are dummies equal to one if an individual has received at least one LT DI transfer over a given period (2006-2007 or 2014-2015). The population included in the regressions contains all salaried workers residing in Belgium and aged 20-64 at the reference periods (2005q4 and 2013q4). Variables included in the regression are: household (5 dummies), age category (9 dummies), NACE 1-digit sector, firm size class (4 dummies), working hours class (8 dummies), daily salary (in 2013 euros) and career length (8 dummies).