The Impact and Incidence of Supplemental Health Insurance: Evidence from Sweden*

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April 30, 2026

Abstract

This paper studies the role of private supplemental health insurance (SHI) in universal healthcare systems. Linking novel microdata on SHI contracts to rich administrative data from Sweden, we document a steep income gradient in take-up: higher-income individuals are substantially more likely to enroll in SHI despite a greater healthcare need among lower-income individuals. Exploiting variation in the timing of employer-sponsored SHI, we find large and persistent increases in healthcare utilization (23 percent). The effects are even larger for low-income individuals and extend beyond specialist consultations to high-value treatments, consistent with binding rationing in public care. Focusing on cancer as a high-stakes condition, we find that SHI increases screening and diagnoses and reduces mortality. Although SHI is privately contracted, its effects materialize largely within the public healthcare system: coverage increases publicly financed utilization and reduces waiting times, generating negative fiscal and congestion externalities.

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I Introduction

Universal healthcare systems are designed to guarantee equitable access to medical care independent of income or wealth. By limiting the role of prices, care is allocated according to medical need rather than willingness to pay (Cutler, 2002). When care is provided at low or zero prices and public capacity is constrained by budgets, excess demand may arise. In such settings, access is mediated through non-monetary mechanisms - such as waiting times, prioritization rules, or gatekeeping by primary-care physicians. When these mechanisms bind, some patients experience delays in care that may be both inefficient and harmful for health (Siciliani et al., 2013; Godøy et al., 2024). Accordingly, concerns about waiting times and rationed care feature prominently in debates on the performance of universal healthcare systems.

Against this backdrop, many countries with universal healthcare systems have experienced a rapid expansion of privately financed healthcare over the past two decades (OECD, 2004). A key manifestation of this expansion is the growth of private supplemental health insurance (SHI), which facilitates access to care alongside the public system, with coverage ranging from around 15 percent in countries like France and the United Kingdom to over 50 percent in Australia and Denmark (OECD, 2025). In Sweden, the setting we study, coverage reaches approximately 15 percent of the working-age population in 2024, representing a fourfold increase since 2006. These contracts are typically marketed as a means of relaxing rationing constraints in the public system, offering, for instance, faster access to both specialists and diagnostic services, elective procedures not covered by the public system, and second opinions.

The SHI expansion plays a prominent role in the policy debate on the role of private markets in healthcare and their interaction with the public healthcare system (Einav and Finkelstein, 2023). Proponents argue that SHI improves efficiency by offering choice and relaxing rationing constraints in the public system, potentially relieving pressure as some patients shift to private providers. Critics, in contrast, emphasize the risk of a two-tier healthcare system, in which more advantaged individuals obtain better access to care through SHI, potentially at the expense of others, exacerbating health inequalities and undermining the egalitarian foundations of universal healthcare. Reflecting these concerns, countries differ widely in how they regulate private health insurance and its interaction with publicly financed care.

This paper seeks to inform the debate by asking three key questions. First, who enrolls in supplemental health insurance? In particular, how does take-up vary across the income distribution, and how does it relate to underlying healthcare needs? Second, what does

SHI do? Does it merely reallocate care across financing sources, or does it relax binding constraints and increase effective access to valuable medical services? Third, what are the spillovers of SHI on those who remain in the public system? Does SHI relieve pressure on public healthcare, or does it crowd in publicly funded care and exacerbate congestion?

Answering these questions is empirically challenging. First, there is typically no population-wide administrative data identifying individuals covered by SHI. Second, administrative data on healthcare utilization generally record only publicly funded care, while information on privately financed healthcare use is only available in separate, proprietary data. As a result, existing evidence provides only limited insight into who is covered by SHI, how coverage affects healthcare utilization, and how SHI interacts with the public system.

We overcome these challenges using data from Sweden — a country with comprehensive, tax-funded universal healthcare and a rapidly expanding market for SHI. Sweden provides an ideal setting for three reasons. First, through a partnership with the industry association representing Swedish private insurers, we obtained access to novel administrative microdata covering the near universe of SHI contracts between 2006 and 2015. Second, we link these contracts to population-wide administrative records on healthcare utilization, prescription drug expenditures, and other individual-level outcomes. Importantly, these data capture both publicly and privately financed care whenever a licensed physician is involved. Third, Sweden's institutional design — universal public coverage combined with the option to purchase private supplemental insurance — as well as the long waiting times are representative of many other universal healthcare systems.

We begin by documenting supplemental health insurance enrollment. Following recent work on income gradients in health and mortality (Chetty et al., 2016; Hagen et al., 2025), we show that SHI enrollment rises sharply with income, with particularly steep gradients at the top of the distribution: take-up rates are below 5 percent in the bottom income decile but are closer to 50 percent in the top percentiles. This enrollment pattern contrasts sharply with gradients in health and corresponding healthcare needs. Individuals in the bottom income percentiles face mortality rates nearly four times as high as those in the top percentiles. We document similar income gradients in overall healthcare spending, suggesting that these differences span a broad set of health-related dimensions. These mirror-image gradients raise concerns not only about equity, but also about efficiency: individuals who stand to gain the most from relaxing rationing constraints — those in worse health and with arguably higher expected returns to care — are the least likely to be insured.

In line with this concern, we find that most of the income gradient in SHI enrollment

is driven by employment and the employer one works for. The majority of SHI contracts in Sweden are employer-provided, and higher-income individuals are substantially more likely to work at firms that offer SHI as a fringe benefit. Because enrollment is typically determined by an employer's collective decision on behalf of all workers, rather than individual choices, the resulting allocation reflects employer-level decisions rather than individual-level healthcare needs. We show that the income gradient is not explained by differences in pre-existing conditions and persists when controlling for a broad set of socioeconomic characteristics as well as cognitive and non-cognitive skills. We also find no evidence of adverse selection into SHI; to the contrary, enrollment is higher among individuals with lower healthcare utilization, even conditional on income. Overall, the gradient appears to reflect supply-side factors correlated with income, rather than selection on underlying healthcare needs or other demand-side factors. These descriptive findings suggest potential redistributive gains from taxing SHI or, if enrollment is deemed too low for efficiency reasons, targeting subsidies to low-income individuals.

Given its uneven distribution and apparent misalignment with healthcare needs, it is essential to understand what SHI actually does. We therefore study the causal effects of SHI on healthcare utilization, exploiting variation in the timing of employer-provided insurance. Comparing workers who receive coverage earlier to otherwise similar workers who receive it later, we find that SHI leads to a large increase in healthcare utilization. Total healthcare expenditures — combining public and private care — increase by approximately 23 percent relative to pre-coverage spending. Importantly, these increases do not reflect short-run re-timing of care. The effects are large and persistent over the four-year horizon we study, and they are not driven by employers selectively covering workers based on evolving health trajectories: such selection would generate differential pre-trends, which we do not observe. These results are robust to alternative designs and specifications, including comparisons across firms of different sizes and SHI enrollment shares.

The large utilization responses suggest that SHI relaxes rationing in the public healthcare system. To elaborate on this interpretation, we unpack these responses along several margins.

First, SHI coverage increases specialist visits while reducing primary care visits. In the public system, patients typically must first consult a primary-care physician to obtain referrals to specialist or hospital care, and access to specialist services is subject to capacity constraints and waiting times. Supplemental health insurance alters this pathway: insured individuals can contact the insurer directly and obtain referrals to private specialists, often with guaranteed maximum waiting times that are considerably lower than corresponding

times in the public administration. If access to specialist care in the public system were not effectively constrained at the primary-care stage, gaining SHI would reduce primary care use without affecting specialist utilization. Instead, we observe a substantial increase in specialist visits, indicating that SHI relaxes binding gate-keeping constraints in the referral process and expands access to specialist care.

Second, the increase in specialist visits is complemented with greater use of prescription drugs and more hospital admissions. Effects are present for a broad set of diagnosis codes, with a positive correlation between the relative effects of SHI on specialist visits and hospital admissions. These patterns indicate that SHI expands access to downstream, high-value care rather than merely inducing *flat-of-the-curve* utilization — that is, additional care at the margin with little clinical benefit.

Third, we find significant heterogeneity across the income distribution. Total healthcare costs increase by more than 50 percent for individuals in the bottom income quartile, more than twice the corresponding increase for individuals in the top quartile. The response among low-income individuals also operates through distinct utilization margins. For low-income individuals, SHI primarily increases hospital admissions and prescription drug use. By contrast, among higher-income individuals, higher spending is driven mainly by a reallocation of care from primary care to specialist visits, with only a modest rise in hospital utilization. This pattern is consistent with lower-income individuals having more healthcare needs, but also facing more binding rationing constraints in public healthcare.

We also examine whether the increase in healthcare utilization translates into improvements in health, focusing on individuals diagnosed with cancer. Using the national patient register, we find that SHI enrollment increases the likelihood of undergoing screening and receiving cancer-related care. We complement these results using the cancer registry data, finding large and significant effects on the detection of cancers. Our most conservative estimates show that the probability of a cancer diagnosis increases by 0.04 percentage points relative to a baseline diagnosis rate of 0.23 percent. We next show that, conditional on a malignant cancer diagnosis, individuals with SHI are diagnosed at an earlier stage compared to those without SHI, and these individuals experience lower subsequent mortality. In particular, we find that controlling for stage at diagnosis can fully explain the survival advantage associated with SHI for a given type of cancer. Moreover, when considering our full population of working-age individuals, we find reductions in all-cause mortality, albeit small and imprecise, which seem mostly driven by cancer-specific mortality.

Taken together, these findings reinforce the interpretation that access to public healthcare is rationed and that SHI can unlock valuable care opportunities with meaningful

health benefits. They thus confirm the concern that steep income gradients in SHI enrollment may exacerbate existing health inequalities.

While these analyses highlight substantial private benefits of supplemental health insurance, we also examine its implications for the public healthcare system. Simply decomposing total healthcare costs, we find that roughly two thirds of the SHI-induced increase in expenditures reflects publicly funded care. Rather than alleviating the public administration, SHI thus crowds in publicly funded care. This generates a fiscal externality and places additional pressure on public capacity.

In addition, SHI shortens enrollees' waiting times for publicly provided specialist care, hospital treatment, and diagnostic services. Controlling for differential selection into healthcare visits across SHI status, waiting times per visit fall by about seven days, on average, relative to a baseline of 48 days.

In a capacity-constrained system, increased utilization and faster access for SHI enrollees imply longer waits for patients without SHI, highlighting congestion externalities associated with unequal coverage. Several pieces of evidence support this interpretation. First, waiting-time reductions for SHI enrollees would not arise unless the public healthcare system were operating close to capacity. Second, diagnoses with longer baseline waiting times—indicative of greater congestion—exhibit larger SHI-induced reductions. Third, we show that patients with SHI move more quickly through public-sector queues because of how referrals are processed: referrals for SHI-covered patients are more likely to receive priority review. In particular, higher-income groups are more likely to have referrals indicating urgency and also experience larger waiting-time reductions.

In the last part of the paper we introduce a conceptual framework that combines the private gains and externalities associated with SHI, together with the differences in enrollment across the income distribution. The framework allows us to quantify welfare effects, assess the distributional implications of SHI and evaluate counterfactuals.

Using a stylized, hedonic approach, our calculations imply an average private value of SHI for enrollees of around 2,000 SEK per year (approximately 224 USD), with roughly 40 percent attributable to reductions in waiting times for both privately and publicly provided care. By comparison, the combined fiscal and congestion externalities imposed on the public healthcare system amount to approximately 1,190 SEK. Imposing a corresponding annual externality-corrective unit tax on SHI premia would amount to roughly 34 percent of lower-end market premia.

These average effects mask important heterogeneity across the income distribution. While the overall private value of SHI and the externalities it generates are broadly similar across income groups - with increased healthcare utilization contributing relatively more

at the bottom of the distribution and waiting-time reductions playing a larger role at the top — the steep income gradient in SHI enrollment has stark distributional consequences. As a result, individuals in the bottom income quartile experience on average negative net benefits from the existence of the SHI market, while net benefits turn positive from the second quartile onward and are largest for individuals in the top quartile.

Taken together, our findings highlight a central tension in hybrid healthcare systems. Supplemental private insurance can improve access to valuable care by relaxing rationing constraints. Yet when coverage is unequally distributed and interacts with publicly financed healthcare, it can also generate sizable distributional costs.

Related literature Our paper contributes to three strands of the literature.

First, we provide new insights on the interaction between public and private healthcare systems. This is a central topic in policy debates, but has received little attention in the academic literature, that provides largely theoretical investigations. Existing models focus on optimal insurance design in settings with heterogeneous demand, moral hazard, cost-sharing, and cross-insurer externalities, primarily emphasizing price-based mechanisms (e.g., Pauly, 1986; Besley, 1989; Selden, 1993, 1997; Blomqvist and Johansson, 1997; Petretto, 1999; Boone, 2015). This work has been complemented by empirical studies documenting important interactions, including crowd-out of private spending and substitution across payers (e.g., Cutler and Gruber, 1996; Finkelstein, 2007; Cabral and Mahoney, 2019), as well as substantial price variation in privately insured markets (Cooper et al., 2019). Our analysis contributes by studying several, first-order margins (e.g., non-price rationing, cross-referrals between private and public provides, congestion externalities), as well as highlighting the distributional implications of mixed systems.[1]

Second, this paper relates to a large and expanding literature on selection into health insurance (e.g., Einav et al., 2010; Hackmann et al., 2015; Geruso and Layton, 2017) and on the impact of health insurance on healthcare utilization and health outcomes (e.g., Finkelstein et al., 2012; Brot-Goldberg et al., 2017; Abaluck et al., 2021). We contribute to this literature by leveraging administrative data to broaden the set of determinants of insurance enrollment (e.g., income gradient) and widen the range of effects it has (e.g., waiting time, cancer diagnosis). We provide this evidence in the context of private sup-

[1] Related to the distributional implications, Shepard et al. (2020) and Hendren et al. (2021) have proposed conceptual frameworks to compare uniform and top-up insurance allowing for heterogeneous income. Related to the non-price rationing, some theoretical papers have studied mixed public–private systems in which access to publicly funded care is rationed through waiting times (e.g., Barros and Martinez-Giralt, 2002; Hoel and Sæther, 2003; Gravelle and Siciliani, 2008), while recent empirical work has highlighted the broad importance of non-price rationing in healthcare allocation (e.g., Layton et al., 2022; Brot-Goldberg et al., 2023).

plemental insurance, for which causal evidence remains scarce. A notable exception is the Medigap literature: for example, Fang et al. (2008) document advantageous selection into Medigap, while Cabral and Mahoney (2019) show the resulting increase in Medicare spending, akin to our estimated fiscal externality on the public insurer. Other contributions on supplemental insurance highlight the role of waiting times, access to private providers, and socioeconomic characteristics in shaping its demand (Besley et al., 1999; Lavaste, 2023), and study its effects on utilization and waiting times (Buchmueller et al., 2004; Kiil and Arendt, 2017; Yang et al., 2024). Much of this literature, however, relies on survey data or insurer-specific records. Instead, we use population-wide data and quasi-experimental variation in access to supplemental coverage.

Third, this paper contributes to the literature on health inequalities and their determinants (e.g., Case and Deaton, 2015; Wagstaff and van Doorslaer, 2000), and most notably to the recent work using administrative data to document socioeconomic gradients in health outcomes (e.g., Chetty et al., 2016; Hagen et al., 2025). We study how supplemental insurance affects inequality both through differential take-up and differential impacts. Only a small number of recent papers examine income heterogeneity in health insurance choices (Geruso et al., 2023; Handel et al., 2024; Fleitas et al., 2025) and healthcare utilization (Bensnes et al., 2026; Nilsson and Paul, 2018). Our results link these margins and help assess how supplemental insurance can affect both efficiency and equity in mixed healthcare systems.[2]

The remainder of the paper is organized as follows. Section II introduces the institutional context and data. Section III analyzes SHI take-up, while section IV presents the impact of SHI. Section V studies the interaction between the private SHI market and the public healthcare system. Section VI puts together estimates of consumer surplus and externalities to evaluate welfare. Section VII concludes.

II Context and Data

Sweden operates a universal, tax-financed healthcare system that provides comprehensive coverage to the entire population, with healthcare organized and delivered primarily at the regional level. Total health expenditure amounts to around 11 percent of GDP (compared

[2]Related work studies the interaction between public and private provision in other domains. In disability insurance, Stepner (2019) and Seibold et al. (2025) analyze private insurance alongside public programs, highlighting both efficiency and distributional implications. In higher education, Chetty et al. (2020) study how access to selective colleges—another private margin layered on top of broad public provision—shapes inequality in long-run outcomes. These settings share the feature that higher-income individuals differentially access and benefit from private margins in domains where more equitable outcomes are often viewed as socially desirable.

with an OECD average of about 9 percent), and approximately 86 percent of total spending is publicly financed (OECD, 2025; Statistics Sweden, 2025).

Access to care is formally allocated based on medical need rather than ability to pay. In practice, however, capacity constraints imply that demand exceeds supply, and access is therefore rationed through non-price mechanisms, including gate-keeping and waiting times. Care is delivered through a sequential pathway: patients typically begin with a primary-care consultation, which may lead to a referral to a specialist and, if needed, to hospital treatment. Prescription drugs can be prescribed at any instant along the way.

Delays arise at each stage of this process and are substantial. The average waiting time for specialist and hospital care is approximately 48 days, which is comparable to other universal healthcare systems (e.g., Norway, Canada, and the U.K.), but longer than in systems that rely more heavily on private health insurance (e.g., the U.S. and Switzerland). Delays are also institutionalized through national care guarantees ("vårdgarantin"), which specify maximum waiting times at different stages of the care pathway: patients should receive a primary-care consultation within three days, a specialist visit within three months, and treatment within an additional three months. Taken together, the time from initial contact to treatment can extend to up to six months in the public system.

As out-of-pocket costs are low throughout, the primary gate-keeping and the delays represent the primary margins along which access to care is effectively rationed. However, alternative mechanisms can relax non-price rationing. One such mechanism is private supplemental health insurance (SHI), which facilitates access to care alongside the public system.

II.A SHI Context

In this section, we provide a brief summary of the market for supplemental health insurance (SHI) and how it operates alongside the universal public healthcare system. A more detailed discussion is available in Appendix A.

SHI has expanded rapidly in Sweden since the early 2000s (Palme, 2017), reflecting demand for faster access to care. While contracts vary across insurers and plans, they share a set of common features. Most importantly, SHI provides expedited access to specialist consultations as well as elective procedures, effectively compressing the time from referral to treatment from several months to a matter of weeks. Insured patients can typically consult a specialist within seven days and receive treatment within three weeks. Many plans allow patients to bypass the primary-care gate-keeping that normally regulates access to specialist care. Insurers also operate medical coordination units that triage patient requests and arrange appointments with specialists and clinics within their

private provider networks. Physicians treating SHI patients may subsequently refer them to publicly funded services when further treatment is required or recommend follow-up care within the public system (Socialdepartementet, 2022). Some plans also cover ancillary services such as second opinions, post-operative rehabilitation, mental health services, and out-of-pocket costs incurred in the public system. However, SHI does not cover emergency services or highly specialized care (e.g., cancer treatment, neurosurgery, or maternity care), which remain exclusively publicly provided.

SHI coverage is obtained through three main channels: employer-sponsored plans (61 percent in 2015), group contracts via unions or other organizations (21 percent), and individual purchases (18 percent). Premiums vary with age — ranging from approximately 3,500 SEK for individuals under 35 to about 25,000 SEK around age 65 — but cannot be conditioned on pre-existing health conditions. Enrollment is typically not possible beyond retirement, and insurers may exclude pre-existing chronic conditions from coverage.

Employer-sponsored contracts play a central role in our research design. Employers may choose to cover some or all employees and can enroll them without requiring active consent, although employees are informed about the benefit and how to use it. At the time of enrollment, firms must certify that employees are at full work capacity.[3] During our study period, employer-sponsored SHI is treated as a tax-exempt fringe benefit.

The provision of supplemental health insurance interacts with the universal public healthcare system along several institutional margins (OECD, 2004; OECD and European Observatory on Health Systems and Policies, 2021). These interactions depend on how private coverage is integrated with publicly financed care and vary across countries, as outlined in Appendix Table A.1. In the Swedish context, SHI primarily facilitates faster access to private specialists, who can refer patients back into the public system for further treatment. At the same time, SHI may relieve pressure on the public system by enabling individuals to bypass primary care or by shifting some care to private providers. Together, these features imply multiple channels through which SHI and the public system are linked, the relative importance of which is ultimately an empirical question.[4]

[3] Appendix Figure A.1 plots the distribution of firm-provided SHI enrollment within cells defined by firm, plant, and two-digit occupation. Roughly 60% of these cells have SHI enrollment rates above 90%, indicating that employers typically enroll nearly all employees within a given plant–occupation group.

[4] An additional channel operates through physicians' labor supply across public and private providers. If SHI expansion induces physicians to shift time or employment toward private providers, this could reduce effective capacity in the public system. We do not observe or estimate such responses. As a result, our estimates of the pressure SHI places on the public system should be interpreted as a lower bound, as they do not account for potential reductions in public-sector capacity.

II.B Data

We utilize several individual-level administrative datasets: (i) proprietary data on supplementary health insurance contracts from Insurance Sweden; (ii) the Integrated Database for Labour Market Research (LISA by Swedish acronym); (iii) the Income Tax Register; (iv) the Wealth Tax Register; (v) Register-based Labor Market Statistics (RAMS by Swedish acronym); (vi) the Wage Survey; (vii) Enlistment Records; (viii) National Patient Register; (ix) National Prescribed Drug Register; (x) care billing data from the Stockholm region; (xi) the Cancer Register; (xii) Central Waiting Time Register of the Stockholm region; and (xiii) the National Cause of Death Register.

Supplemental Health Insurance Central to our analysis is a novel dataset on supplementary health insurance contracts obtained through Insurance Sweden, an industry organization comprising approximately 50 insurance companies and covering more than 90 percent of the total Swedish insurance market. The data record all active contracts as of December 31 for each year between 2006 and 2015 at the individual level, along with contract start dates. We observe whether coverage is employer-provided (including firm identifiers), individually purchased, or acquired through group membership (e.g., unions). Using these data, we construct an annual panel of SHI enrollment for working-age individuals (ages 25-65).

Healthcare Utilitization We observe all outpatient visits and inpatient admissions during 2001–2017 through the National Patient Register (NPR), which we refer to as specialist visits and hospitalizations, respectively. Reporting to the register is mandatory for all care providers, regardless of whether care is publicly or privately financed.[5] The data include diagnosis codes (ICD-10), treatment codes, dates of admission and discharge, and provider identifiers.

The NPR does not capture primary care visits and does not distinguish between publicly and privately financed care. To address these limitations, we complement the NPR with healthcare billing data from the Stockholm region—the largest of Sweden's 21 healthcare regions, covering roughly 30% of the SHI market. These data record all invoices submitted by both public and private providers to the public payer and include primary care services. Importantly, they allow us to distinguish between publicly and privately financed care.

[5]Socialstyrelsen (2022) documents some under-reporting of healthcare utilization, particularly among private providers. As a result, our estimates of the impact of SHI on healthcare consumption may be biased downward, potentially to a greater extent for privately provided care.

For Stockholm residents, we link each visit in the NPR to the corresponding invoice in the Stockholm billing data using individual identifiers, service dates, and provider identifiers.[6] Visits with a matching invoice are classified as publicly financed, while unmatched visits are classified as privately financed.[7]

The Stockholm data also record invoice amounts, which we use to measure healthcare costs. Specifically, we compute average costs for each diagnosis–procedure–year cell and apply these values to all visits. This approach assumes that costs within cells are comparable across regions and financing sources.[8]

Prescription Drugs The National Prescribed Drug Register contains complete records of all prescription drugs dispensed at pharmacies in Sweden since July 2005. It includes detailed information on each dispensation, including the date, the Anatomical Therapeutic Chemical (ATC) code, the dosage, and the number of defined daily doses (DDD). We also observe both the shelf price and out-of-pocket (OOP) price of each prescription.

Cancer Records Using the Swedish National Cancer Register, we observe newly diagnosed tumors between 2003 and 2015, including all malignant neoplasms (cancer), carcinoma in situ (CIS) – a non-invasive neoplasm with the potential to progress to invasive cancer – and a subset of benign tumors. The data include tumor location (ICD-10 classification), date of diagnosis, clinical stage at detection, and planned treatment. Diagnoses are initially reported by the treating clinician and subsequently updated based on pathology results, which provide the definitive classification, ensuring that the register reflects confirmed diagnoses. This reduces concerns about misclassification of early-stage diagnoses.

Waiting Times We obtain data on referrals to publicly funded care from the Stockholm region's Central Waiting Time Register (CVR) for the period 2008–2015. The unit of observation is a referral for treatment or diagnostic services at publicly funded providers, regardless of whether the referring physician operates in the public or private sector.

We measure waiting time in days as the interval between the referral submission date and the date on which care is completed. Referring physicians can indicate urgency by

[6] When multiple visits occur on the same day, we use ICD codes to distinguish between them.

[7] If Stockholm residents receive publicly funded care outside the region, such visits would not appear in the Stockholm invoice data, implying that we may underestimate publicly financed care.

[8] Costs may vary within diagnosis–procedure–year cells, but such heterogeneity introduces classical measurement error. Appendix Figure B.1 provides an out-of-sample validation of the imputation procedure within Stockholm. Using an independent 20 percent holdout sample, imputed prices closely track observed prices for both specialist visits and hospitalizations, with estimated slopes close to unity.

marking a designated field on the referral form, and the data include an indicator for whether a referral is classified as urgent. The data also contain detailed procedure codes describing the type of care provided.

Income Ranks We construct an individual-level measure of income rank following Chetty et al. (2016). We define equivalized disposable income as total household income — including both taxable and non-taxable sources — net of taxes and transfers, adjusted for household composition using equivalence weights.[9]

For each year t, we compute average disposable income over the three preceding years ($t-3$ to $t-1$) and rank individuals within gender and birth cohort based on this measure. For the descriptive analysis in Section III, we follow Hagen et al. (2025) and exclude individuals in the bottom decile of the income distribution prior to ranking, as well as those not observed in all three years.[10]

We construct analogous ranks based on average net wealth over the period 2004–2006, following Nekoei and Seim (2023).

Skill Measures Skill measures are available from military enlistment data for men born between 1951 and 1975, cohorts for whom military conscription was mandatory. Cognitive ability is measured as the within-cohort rank of the sum of scores from four subtests: synonyms, inductions, metal folding, and technical comprehension. Non-cognitive ability is measured on a 1–5 scale based on a semi-structured interview with a psychologist, capturing social maturity, intensity, psychological energy, and emotional stability; we use these raw scores in the analysis.[11]

Additional Data In addition to these registers, we use several auxiliary data sources. From the LISA database, we obtain demographic and socioeconomic information and define our baseline population of Swedish residents. We also use the National Cause of Death Register to observe dates and causes of death. We retrieve occupation codes from the Wage Survey and employer-employee match data from RAMS.

[9] We employ a modified OECD equivalence scale with weights 1.00 for single adults; 1.51 for cohabiting couples; +0.60 for each additional adult; +0.52 for the first child aged 0–19; and +0.42 for each additional child aged 0–19.

[10] This avoids atypical reporting due to periods abroad, tax-exempt income, or other irregular income patterns.

[11] For further details on the enlistment data, see Lindqvist and Vestman (2011) and Hermo et al. (2022).

III SHI Enrollment: Income Gradient

As in many countries, the market for supplemental health insurance (SHI) in Sweden is sizable and has expanded rapidly. During our sample period (2006–2015), coverage among the working-age population more than doubled, from roughly 4 percent to over 10 percent, as shown in Appendix Figure C.1. By 2024, it has reached approximately 15 percent and in 2024, SHI financed approximately 1.9 million healthcare visits, including around 70,000 surgical procedures (Svensk Försäkring, 2025). Employer-sponsored contracts dominate the market, and their share remains stable over time. Enrollment follows a pronounced inverted U-shaped age profile: take-up rises with age, peaks around age 50, and then declines thereafter, in part reflecting age-related increases in insurance premiums.

Enrollment in SHI is highly unequal. Comparing individuals with and without SHI across a range of socio-economic characteristics (i.e., education, migration status, income, and wealth) reveals substantial differences, as shown in Appendix Table C.1. To characterize these disparities more granularly, we examine enrollment across the disposable income distribution. Panel (a) of Figure 1 shows that coverage of any form (employer-provided, group, or individual) is only about 2–3 percent in the lowest income percentiles, but rises steadily with income and increases sharply at the top, approaching 50 percent in the highest percentile.[12]

This gradient stands in stark contrast to the distribution of health and healthcare use. We measure annual healthcare costs as total system costs from primary care, specialist visits, hospital care, and prescription drugs over the calendar year. Panel (b) of Figure 1 shows that both mortality and healthcare costs decline monotonically with income, with the steepest gradients at the bottom of the distribution. The three-year mortality rate is 0.8 percent at the bottom, compared to 0.2 percent at the top—a fourfold difference. In other words, the income profile of SHI enrollment is nearly the mirror image of the income profile of health: individuals with the highest mortality risk and the greatest healthcare utilization are the least likely to hold supplemental insurance.

The misalignment raises concerns about both equity and efficiency, as those with the highest potential returns to care are the least likely to be insured. We therefore briefly explore the sources of the income gradient in take-up. Table 1 reports how the relationship between SHI enrollment and income quintiles evolves as we sequentially add controls.

One potential explanation is that lower-income individuals face effective barriers to coverage due to worse underlying health. Although insurers cannot price on health or

[12]The expansion of SHI over time has been disproportionately concentrated among high-income individuals, resulting in an increasingly steep income gradient in enrollment, as shown in Appendix Figure C.2).

deny applicants from enrolling, pre-existing conditions are typically excluded from coverage. However, controlling for chronic conditions hardly attenuates the income gradient (Column 2).[13]

The gradient, however, declines substantially once we account for employer fixed effects and a separate unemployment indicator (Column 3): the estimated difference in take-up between the top and bottom quintiles is reduced by one half. This reflects the central role of employers in providing SHI: higher-income individuals are more likely to work at firms offering SHI as a fringe benefit. As a result, access to insurance is largely shaped by employer decisions, which arguably weakens the link between coverage and health needs. Adding fixed effects for broad occupation categories (including an indicator for employed individuals without an occupation code) further attenuates the gradient. All in all, our set of control variables explain almost two thirds of the income gradient in take-up.

Still, a significant gradient remains, even after accounting for variation across employers and occupations. To assess whether this residual variation is demand-driven, we sequentially add controls for socioeconomic characteristics and cognitive and non-cognitive skills in Panel B of Table 1, using a subsample of men with enlistment data. However, these controls explain only about a quarter of the remaining income gradient. This suggests only small differences in individual preferences or decision-making ability and confirms the limited role of observable demand-side factors as indicated by the opposing income gradients in enrollment and healthcare utilization.[14] We find that the so-called advantageous selection into SHI also holds within income groups: conditional on income, individuals with SHI have lower pre-enrollment healthcare utilization than those without SHI (Appendix Table C.3). Thus, even conditional on income, SHI enrollment does not align with underlying healthcare needs.[15]

Taken together, the evidence documents a strong and growing income gradient in SHI enrollment, which is largely mediated by employer provision and which is poorly aligned with healthcare needs. Whether this misallocation ultimately exacerbates health inequality depends on the value of SHI in practice. We turn to this question next by

[13]We proxy for 22 chronic conditions based on repeated prescriptions drug use, following Danesh et al. (2024). Appendix Table C.2 lists the conditions and corresponding ATC-codes.

[14]The remaining gradient may still partly reflect employer-side selection - for instance, firms targeting coverage to higher-paid employees - or *income effects*. Under the latter interpretation, non-linear income taxation can deliver a more equitable allocation of SHI and would be preferable to taxing SHI directly, in line with classic optimal taxation arguments trading-off efficiency and equity (Atkinson and Stiglitz, 1976; Ferey et al., 2024).

[15]We estimate that roughly one third of the negative correlation between SHI and utilization is explained by income. The correlation is also weaker among individuals with higher cognitive ability, consistent with Fang et al. (2008) and Handel et al. (2024).

estimating the causal effects of SHI on healthcare utilization and health outcomes.

IV SHI Impact: Design and Results

This section estimates the causal effects of SHI on healthcare utilization and health outcomes. We first outline the empirical design, then present the main results and a set of robustness checks, and finally unpack the mechanisms underlying the estimated effects.

IV.A Empirical Design

Our baseline design exploits variation in the timing of employer-provided SHI. We compare individuals who first obtain SHI in year t to otherwise similar individuals who obtain SHI in year $t + \delta$. Similarity is defined along observable characteristics - gender, birth cohort, and pre-determined labor market outcomes - and the identifying variation comes from quasi-random differences in the timing of employer-provided insurance coverage (e.g., Fadlon and Nielsen, 2021; Nekoei and Seim, 2023).

The identification strategy relies on two key assumptions. First, conditional on observables, the timing of employer-provided SHI is orthogonal to employees' health trajectories within a δ-year window. Importantly, the design allows for selection into SHI based on health *levels*, but not on health trends.[16] Second, SHI adoption is not systematically correlated with other contemporaneous shocks to healthcare utilization at the worker level.

Appendix Figure D.1 illustrates the research design. Panel (a) plots SHI enrollment for cohorts first covered in 2008, 2011, and 2014, restricting attention to individuals without prior coverage. Enrollment increases mechanically at adoption and remains persistently higher thereafter, with gradual declines driven by early retirement, job mobility, and other exits.

Panel (b) shows average hospital visits for the same enrollment cohorts. Pre-treatment levels and trends are nearly identical, supporting the parallel trends assumption. Following SHI take-up, hospital visits increase sharply and persistently. Panel (c) plots differences in hospital visits between the 2008 enrollment cohort and alternative control groups that receive SHI between 2010 ($\delta = 2$) and 2015 ($\delta = 7$). Pre-treatment differences are persistently flat and close to zero, while post-treatment differences are similar across

[16] The typical arrangement is for employers to enroll either their entire workforce or all employees within a given occupation. Appendix Figure A.1 shows that, among cells defined by firm, plant, and occupation in which at least one employee has SHI, the vast majority exhibit very high rates of employer-provided SHI coverage.

control groups, indicating that estimates are largely insensitive to the choice of δ within this range.

These patterns suggest that individuals who receive SHI within a seven-year horizon would have followed similar healthcare trajectories in the absence of treatment. We therefore pool cohorts to maximize statistical power. Our baseline sample consists of individuals who receive employer-provided SHI between 2007 and 2010. For each cohort, we define the control group as individuals who receive SHI at least five years later. For example, the control group for the 2007 cohort consists of workers who receive SHI between 2012 and 2015.

To ensure comparability between treated and later-treated individuals, we impose symmetric sample restrictions and reweight the control group. Individuals must be aged 27–63 at event time $k = 0$, employed in both $k = -1$ and $k = 0$, have no prior disability insurance, and be resident in Sweden throughout the window $k = -5$ to $k = 5$.[17] These restrictions imply that both treated and control individuals are alive at $k = \delta$.

We further improve balance by reweighting the control group to match the distribution of observables in the treated group at $k = -1$, following DiNardo et al. (1996). We reweight on gender (2 bins), age (4 bins), labor income decile (10 bins), and job tenure (6 bins), yielding 480 cells. Table D.1 shows that this procedure delivers close balance across groups.[18]

We estimate dynamic treatment effects using the following event-study specification:

$$\hat{y}_{it} = \alpha + \sum_{k=-4}^{4} \beta_k \cdot \mathbf{1}\{t - T_i = k\} + \mu_{T_i} + \varepsilon_{it}, \tag{1}$$

where $\hat{y}_{i,t} = y_{i,t} - \hat{y}_t^c$ denotes the outcome net of the appropriately weighted control-group mean, T_i is the year of SHI enrollment, and μ_{T_i} are treatment-cohort fixed effects. The coefficients β_k trace the evolution of outcomes relative to the year of SHI take-up ($k = 0$), with $k = -1$ as the omitted category. Standard errors are clustered at the individual level.[19]

[17] The restrictions ensure eligibility for employer-provided SHI by restricting attention to employed individuals with full work capacity.

[18] Reweighting is done within each treatment and control group pair (e.g., we reweight $C = 2012$–2015 to match $T = 2008$). The resulting weights have mean 1 and range from 0.03 to 20.11, with 98% lying between 0.23 and 2.71.

[19] In some specifications, we also report a simpler pre-post difference-in-differences estimate:

$$\hat{y}_{it} = \alpha + \beta \cdot \mathbf{1}\{t - T_i > 0\} + \mu_{T_i} + \varepsilon_{it}. \tag{2}$$

Finally, we implement an alternative difference-in-differences estimator following Callaway and Sant'Anna (2021), which uses all not-yet-treated and never-treated individuals as controls. While this approach improves statistical power and relaxes the restriction that the control group must be employed in a future year, our baseline design - based on variation in timing among treated individuals - enhances comparability and avoids compositional changes in the control group over time.

IV.B Main Results

Panel (a) of Figure 2 presents our baseline estimates of the effect of employer-provided SHI on total healthcare costs around the time of enrollment. Total costs aggregate all privately and publicly funded care, including primary care visits, specialist consultations, hospitalizations, and prescription drugs.[20]

Gaining SHI leads to an immediate, large and persistent increase in healthcare utilization. Three years after take-up, annual healthcare costs rise by approximately 1,000 SEK, corresponding to a 23 percent increase relative to the pre-treatment mean.[21] The event-study estimates show no evidence of differential pre-trends: healthcare costs remain flat prior to enrollment and increase sharply thereafter.

Panel (b) decomposes the utilization response. Specialist visits, hospitalizations, and prescription drug use all increase following SHI enrollment, while primary care costs decline. The dynamics are similar for the different healthcare margins. Figure 3a summarizes magnitudes by scaling period-3 effects by pre-treatment means: specialist costs increase by 24 percent, prescription drugs by 7 percent, and hospital costs by 36 percent, while primary care costs fall by 19 percent.[22]

These patterns closely mirror the institutional features of SHI and point to a common mechanism: SHI relaxes binding non-price rationing in the public system.

First, as discussed, SHI allows patients to bypass primary care and access specialists directly. We use this institutional feature to test whether access to specialist care is constrained in the public system. If primary care did not function as gatekeepers, SHI would simply accelerate the care pathway-reducing primary care use without affecting specialist utilization. Instead, we observe a decline in primary care alongside a substantial increase in specialist costs. This pattern suggests that access to specialist care is constrained

[20] Primary care effects are estimated using data from Stockholm. We combine these estimates with nationally estimated coefficients for the remaining outcomes and compute standard errors using the delta method. Appendix Figure E.1a shows similar patterns when restricting all outcomes to Stockholm.

[21] Appendix Figure E.2 shows that the first-stage take-up coefficient is approximately 0.65 after three years, implying an IV estimate of roughly 35 percent.

[22] Appendix Figure E.3 shows analogous patterns for visit counts and prescription fills.

at the referral stage and that SHI relaxes this constraint by shifting patients onto a different treatment pathway.

Second, and importantly, the response extends beyond specialist visits to downstream care. If SHI merely induced low-severity patients to seek specialist opinions, effects would be confined to that margin. Instead, prescription drug use increases and hospitalizations rise markedly. The hospitalization response operates along both the extensive (number of admissions) and intensive (days per admission and costs per day) margins. Moreover, SHI leads to more surgical procedures and thus not only diagnostic tests or consultations. The hospital effects are also persistent over time and thus do not simply reflect short-run retiming.

Third, the increase in utilization spans numerous medical conditions, rather than being confined to narrow and concentrated diagnoses. Figure 3b plots diagnosis-specific effects at the ICD chapter level, with specialist visit responses on the x-axis and hospitalization responses on the y-axis. We find a positive relationship between increases in specialist visits and hospitalizations. Appendix Figure E.4 provides further detail at the three-digit ICD-level. The largest relative increases occur for mental health conditions — including stress and depression — and for musculoskeletal disorders, such as back and joint pain, but effects are present across a wide range of diagnoses.

The magnitude of the response is difficult to reconcile with changes in financial incentives due to SHI. In Sweden, approximately 86 percent of healthcare spending is publicly financed (OECD and European Observatory on Health Systems and Policies, 2021), with the remaining share paid privately, including (small) out-of-pocket payments in the public system. Assuming that SHI increases coverage by about 14 percent with a moral-hazard elasticity of -0.2 (Manning et al., 1987; Finkelstein et al., 2012), one would predict a modest increase in utilization of less than 3 percent. In contrast, we estimate that gaining SHI increases healthcare utilization by approximately 23 percent.

Taken together, the evidence points to a clear interpretation: SHI increases overall healthcare utilization substantially by relaxing non-price rationing constraints in the public system. The effects are not limited to reallocating care across margins, nor do they reflect marginal, low-value utilization. Instead, SHI expands access to downstream clinically meaningful care. We return to this interpretation below, but first assess the robustness of these findings.

IV.C Robustness

We probe the robustness of our findings along several dimensions, focusing on concerns related to comparability, selection, and employment outcomes.

Design and Controls Our baseline design compares individuals who receive SHI earlier to those who receive it later. To further improve comparability, we reweight the control group by gender, age, pre-treatment labor income and tenure, to match the treated group (DiNardo et al., 1996). Panel (a) of Appendix Figure E.5 shows that the estimated effects are very similar across reweighting schemes, including without reweighting. This suggests that treated and control individuals are broadly comparable along observable characteristics and that our results are not driven by a residual imbalance in basic demographics.

A potential concern is that the design implicitly conditions on future employment, as control individuals must be employed at some later date. To assess whether this restriction affects healthcare utilization directly, we implement a placebo design. Specifically, we randomly assign placebo enrollment years within gender–cohort strata and impose the same employment restrictions as in the baseline design. We then estimate event-time effects around those placebo events. If conditioning on employment selected individuals with systematically different health trajectories, we would observe spurious changes in healthcare utilization following the placebo event. Instead, Appendix Figure E.6 shows estimates close to zero across outcomes, indicating that the employment restriction does not generate the baseline treatment effects.

We also implement an alternative design that uses all not-yet-treated individuals - including both later-treated and never-treated - as controls, following Callaway and Sant'Anna (2021). This approach relaxes the requirement that control individuals are employed at a future date. The resulting estimates, reported in Appendix Figure E.5, are broadly consistent with the baseline specification. We cannot rule out differential pre-trends in this specification, which may reflect that eligibility for employer-provided SHI requires full work capacity, whereas never-treated individuals may be less likely to meet this condition. Nevertheless, the estimated treatment effects are broadly similar to the baseline.

Selection into SHI The absence of pre-treatment trends in Figure 2a may not be surprising given that employers tend to make collective decisions about whom to enroll. Nevertheless, we consider the possibility that employers selectively enroll workers based on anticipated health trajectories. To address this concern, Panel (c) of Appendix Figure E.5 focuses on enrollment events in which at least 70% of previously uninsured employees are covered simultaneously. In these cases, enrollment reflects a clear, collective employer decision and is less likely to depend on individual-level characteristics. The estimated effects are very similar to the baseline estimates, suggesting that selective enrollment of employees is unlikely to drive our results.

Our previous evidence points to limited scope for individual-level selection when SHI enrollment reflects collective employer decisions. However, this argument weakens in small firms, where enrolling a large share of workers may correspond to only a few individuals. In such settings, individual employees may exert meaningful influence over SHI provision. To assess this, Panel (c) of Appendix Figure E.5 also splits the sample by firm size. If individual-level selection were important, effects should be stronger in smaller firms. Instead, we find very similar estimates across firm size groups, suggesting that individual influence over SHI provision is unlikely to explain our results.

Relatedly, employees may sort into firms based on SHI provision. Panel (d) of Appendix Figure E.5 reports estimates by tenure at the time of SHI enrollment. Individuals with longer tenure are unlikely to have selected into the firm based on future SHI provision, whereas those receiving SHI around entry may have done so. We find small and statistically insignificant differences across tenure groups, suggesting that sorting into SHI-providing firms is unlikely to explain our results.

Additional outcomes We next examine labor market outcomes to shed further light on the mechanisms underlying our main results. In particular, SHI enrollment may coincide with changes in job characteristics, such as promotions or job mobility, which could generate bundled income effects. At the same time, improved access to healthcare may affect labor supply through changes in health or detection. Finally, SHI may be valued as a workplace amenity and thus be offset by compensating wage adjustments. We examine these channels in Appendix Figure E.7.

Panel (a) considers labor income. We observe a sharp increase at the time of SHI take-up, consistent with job mobility or promotions. However, this increase is short-lived and largely reverses within a few years, in contrast to the persistent rise in healthcare utilization. Moreover, in the institutional setting we study - where out-of-pocket costs are low - changes in income are unlikely to generate large changes in healthcare demand, consistent with evidence from lottery-based wealth shocks showing limited effects on health and healthcare utilization in Sweden (Cesarini et al., 2016). Taken together, these patterns suggest that bundled income changes are unlikely to account for our main results.

Panels (b) and (c) consider sick-leave and disability benefits. Both outcomes increase substantially following SHI enrollment. These patterns are consistent with increased healthcare utilization leading to greater detection of health conditions and higher take-up of health-related social insurance.[23]

[23]We obtain similar qualitative patterns using the Callaway and Sant'Anna (2021) estimator, which does not require control individuals to be employed in the future. The corresponding estimates show comparable post-treatment increases in sick leave and disability benefits, alongside similar income dynamics. While

Panels (d)–(f) interact these outcomes with the share of coworkers gaining SHI in the same year, capturing the extent of within-firm expansions of coverage. In settings with large expansions - where SHI provision is less likely to reflect individual promotions or mobility - the income response is attenuated, whereas increases in sick-leave and disability benefits remain strong, and if anything more pronounced. These correspond to the stronger healthcare utilization responses observed in these settings (Panel (b) of Appendix Figure E.5).

Taken together, these results show that income and health-related outcomes evolve differently following SHI enrollment. The transitory nature of income responses, and their attenuation in settings with broad within-firm expansions, provide little support for bundled job changes or compensating wage adjustments as explanations. In contrast, the persistent increase in sick leave and disability benefits is consistent with improved access to care affecting health and detection. This pattern reinforces our interpretation that SHI primarily operates by relaxing non-price rationing constraints in access to care.

IV.D Income Heterogeneity

Having documented large income gradients in SHI enrollment in Section III, we now examine how the effects of SHI vary across income groups. We split individuals by their disposable income rank, assessed in the year prior to SHI enrollment, as described in Section II.B. Figure 4 shows a steep gradient in treatment effects: the increase in total healthcare costs declines sharply with income. Relative to the group-specific pre-treatment mean, the effect exceeds 50 percent in the bottom income quartile and falls below 20 percent in the top quartile.[24]

This gradient provides again evidence suggestive of SHI relaxing binding rationing constraints in the public system. The largest utilization responses occur among individuals who are furthest from care - those facing the greatest barriers to accessing specialist services and downstream treatment. In contrast, for higher-income individuals, who are likely to face weaker constraints, the marginal impact of SHI is substantially smaller.

Panel (b) further clarifies the nature of these differences. For lower-income households, SHI induces large increases in hospitalizations, with costs rising by close to 100 percent in the bottom quartile, alongside a 23 percent increase in specialist costs. In contrast, in the top income quartile, hospital costs increase by only 22 percent despite a comparable rise

these estimates exhibit noisier pre-treatment patterns and should be interpreted with caution, the overall dynamics remain consistent.

[24]Appendix Figure E.2 shows that this gradient is not driven by differential take-up dynamics across income groups. If anything, the implied IV estimates display an even steeper gradient, as the first stage is slightly stronger among higher-income households.

in specialist costs of 29 percent. Prescription drug spending exhibits a similar declining gradient, with effects close to zero at the top of the income distribution. These patterns indicate that for lower-income individuals, specialist access is tightly rationed and unlocking it activates substantial downstream treatment. In contrast, for higher-income individuals, similar increases in specialist use generate little additional treatment, implying that access constraints are not binding.

Taken together, these results suggest that SHI delivers the greatest private value to individuals who are most constrained by the public system. At the same time, these are precisely the individuals least likely to be covered. The combination of steep treatment-effect gradients and sharply declining enrollment implies a misallocation of access to high-value care across income groups, with important implications for both efficiency and equity.

IV.E Cancer and Mortality

We next examine whether the increase in healthcare utilization induced by SHI translates into improvements in health outcomes. Detecting such effects in the full sample is challenging, as the study population consists primarily of working-age individuals in good health with low baseline mortality. We therefore focus on a setting where access to care is likely to matter most for health: individuals diagnosed with cancer. Cancer outcomes depend critically on early diagnosis — a margin directly affected by access to diagnostic services and therefore particularly sensitive to the relaxation of access constraints through SHI.[25] It is also a diagnosis that is predominantly treated within the public system, implying that any SHI-related effects reflect changes in access and the allocation of care, rather than differences in treatment quality.

We start by estimating the impact of SHI on cancer-related care using our baseline design. The solid, blue series in Panel (a) of Figure 5 shows that SHI increases cancer-related specialist and hospital visits substantially and significantly (53 percent at $t = 3$). These visits include both diagnostic services and treatments. SHI also increases general health screenings over time (14 percent at $t = 3$), as shown by the dashed, red series. These screenings capture visits during which suspicion of cancer is often first formed, as well as broader diagnostic activity.

We next use the National Cancer Register to examine whether increased diagnostic activity translates into higher cancer detection. Panel (b) of Figure 5 shows that SHI leads to a marked increase in new cancer diagnoses. Using our baseline design, the

[25] Appendix Figure F.1 shows substantially higher mortality rates among cancer patients, particularly at late stages.

annual probability of diagnosis rises by approximately 0.125 percentage points following SHI enrollment, relative to a pre-SHI mean of 0.23 percent.[26] However, this estimate may be biased upwards as cancer diagnoses can reduce future employment. Using all not-yet-treated individuals as the control group instead confirms the increase in cancer diagnoses, but the effects are indeed smaller at around 0.04 percentage points (Panel (c)). Such increases in detection are particularly consequential when cancers are malignant but still treatable.

These diagnoses include benign tumors, carcinoma in situ (CIS) - abnormal cells that have not yet spread - as well as malignant cancers across stages I (small cancer localized to the original organ) through IV (cancer that has spread to distant parts of the body). Appendix Figure F.3 reports effects separately by cancer type and stage. While all subcategories exhibit positive and significant effects, the estimates are not precise enough to rule out differential effects, either using later-treated or not-yet-treated individuals as controls. A key limitation is that the working-age population we study has low baseline cancer risk, particularly for late-stage diagnoses.

To shed light on how SHI affects the stage at diagnosis and subsequent survival, we complement the difference-in-differences design with a cross-sectional analysis among individuals diagnosed with cancer. Panels (c) and (d) in Figure 5 report OLS estimates from:

$$y_i = \alpha + \beta \, \text{SHI}_i + X_i'\gamma + \varepsilon_i, \tag{3}$$

where y_i denotes either stage at diagnosis or three-year mortality, and SHI_i indicates SHI coverage in the year prior to diagnosis. We include all three types of SHI coverage (Section II.A) and control for age, gender, region of residence, education, and disposable income rank dummies. The sample includes individuals aged 27–63 with a first cancer diagnosis between 2007 and 2015 who were employed in the year prior to diagnosis.[27]

Panel (c) suggests that SHI shifts diagnoses toward earlier stages.[28] The OLS estimates decline monotonically with stage: the probability of a CIS or Stage I diagnosis increases by more than 0.5 percentage points, while the probability of a Stage IV diagnosis falls by approximately 1 percentage point. The increase at the CIS margin is particularly important, as detection prior to invasive disease is closely linked to improved prognosis.

[26] Appendix Figure F.2 shows substantial heterogeneity across cancer sites. The largest increases in new diagnoses are concentrated in more common and diagnostically intensive categories (e.g., male genital organs, digestive organs, and hematologic malignancies), whereas effects are smaller for less common or harder-to-diagnose cancers. This pattern is consistent with increased detection, especially in cancers where screening and diagnostic intensity are higher.

[27] This age restriction follows the main specification, where we focus on individuals who enter SHI between ages 27 and 63.

[28] In this panel, we additionally control for cancer site dummies.

These estimates are consistent with improved access to diagnostic services leading to detection at earlier stages.

Panel (d) shows that these differences in diagnoses translate into differences in survival. Conditional on cancer site, SHI is associated with a reduction in three-year mortality following malignant diagnoses of approximately 0.6 percentage points, relative to a baseline of 18 percent. Importantly, this difference is unaffected by other comorbidities, as controlling for chronic diseases does not affect the estimate. Moreover, we find no mortality differences for benign tumors and carcinoma in situ, which serve as a placebo test, since baseline mortality for these conditions is low. Strikingly, the mortality advantage disappears entirely once we condition on stage at diagnosis. The remaining difference becomes small and statistically insignificant, comparable to the placebo estimates. Hence, the earlier stages at which given cancer types are diagnosed for individuals with SHI can explain the differences in survival probabilities.[29]

Taken together, these results point to a clear mechanism. SHI increases screening and diagnostic activity, raises detection, and shifts diagnoses toward earlier stages. These shifts, in turn, translate into meaningful survival gains, highlighting the importance of timely access to care.[30]

We further examine whether these survival effects are visible at the population level. Appendix Figure F.5, Panel (a), reports reduced-form effects of SHI on all-cause one-year mortality hazards and cumulative mortality using not-yet-treated individuals as controls, estimated again following Callaway and Sant'Anna (2021). The estimates are negative but small and imprecisely estimated. Panel (b) reports cause-specific three-year cumulative mortality, showing that cancer accounts for a substantial share of the estimated reduction, albeit imprecisely estimated.

V SHI Externalities: Public Healthcare Costs and Waiting Times

The evidence so far shows that SHI substantially increases individual healthcare utilization, with the largest effects among individuals who appear most constrained in the public system. How this increased utilization maps into the publicly financed healthcare system, however, is not obvious ex ante. One view — often emphasized by proponents of SHI - is that private insurance induces substitution away from publicly funded care, thereby

[29] We also report IV estimates from a research design that exploits firm-level variation in SHI enrollment rates, which yield similar results (see Appendix Tables F.1 and F.2). This strategy helps alleviate concerns about selection into SHI based on unobserved health or preferences, as firm-level variation plausibly shifts insurance coverage independently of individual health status. The similarity of IV and OLS estimates suggests that such selection is unlikely to be the primary driver of the results.

[30] Appendix Figure F.4 shows that this pattern is robust across one- through five-year horizons.

alleviating pressure on the public system. An alternative view is that SHI relaxes access constraints in ways that increase utilization within the public system itself, generating fiscal and congestion externalities. Distinguishing between these channels is central for evaluating the welfare consequences of private insurance in a universal system.

V.A Cost Externalities

We begin by decomposing the effect of SHI on healthcare utilization by funding source. This decomposition allows us to assess whether privately provided insurance substitutes for, or instead crowds in, publicly financed care.

Our setting provides a unique opportunity to do so using data from Stockholm. As described in Section II.B, we observe all healthcare services invoiced to the public payer through administrative records from the Stockholm region, covering both public and private providers. For the Stockholm residents, we also observe all physician-based healthcare encounters in the National Patient Register, which includes both publicly and privately funded utilization.[31]

Figure 6 reports the effect of SHI on healthcare costs at event time $t = 3$, scaled by the pre-treatment means and decomposed by funding source.[32] A striking pattern emerges: approximately 70 percent of the total increase in healthcare costs is borne by the public sector. In levels, SHI increases publicly funded healthcare costs by 716 SEK per individual per year relative to later-treated individuals.

To understand this result, Figure 6 further decomposes along the care pathway. SHI induces individuals to bypass general practitioners, reducing publicly funded primary care. However, these savings are more than offset by increases in specialist care, prescription drug use, and hospitalizations. Since the latter two are mostly publicly funded, any increase along these margins is particularly important for determining the cost externality of SHI.

These downstream patterns reveal a mechanism through which SHI operates. By relaxing access constraints at the point of specialist care, SHI shifts individual into treatment pathways that are largely financed by the public sector. As a result, privately provided insurance crowds in publicly funded care rather than substituting for it.

[31] Our measure of publicly funded healthcare costs is comprehensive and precisely observed. By contrast, privately funded care associated with SHI should be interpreted as a lower bound, as SHI contracts may cover services not involving a physician — such as physiotherapy, second opinions, or other ancillary services — which are not captured in the National Patient Register. This limitation does not affect our estimates of publicly funded care, which are our primary focus.

[32] Appendix Figure shows the corresponding dynamic estimates for privately funded healthcare costs, separately for hospitalizations and specialist visits.

Taken together, the results imply that SHI generates substantial fiscal externalities within the Swedish healthcare system. More broadly, they highlight that privately and publicly financed healthcare are tightly interconnected. The magnitude and sign of these interactions depend on institutional factors such as gatekeeping, coverage boundaries in private insurance, and the regulation of referrals across sectors. In the Swedish setting, separate financing does not imply separate systems: privately provided access effectively governs downstream use of publicly financed care.

V.B Waiting Times

We next study whether SHI affects the speed of publicly funded care. In a capacity-constrained system, this captures whether SHI increases congestion or shifts access. We test whether enrollees receive care faster for a given diagnosis and treatment.

The basis for studying this question is referral-level data from the Stockholm region's Central Waiting Time Register, which records waiting times in the public sector for specialist visits, hospital treatment, and diagnostic procedures. Appendix Figure G.1 shows that individuals with SHI experience substantially shorter waiting times, with an average gap of 5.7 days. While informative, these raw differences may reflect selection or differences in care-seeking behavior, motivating a causal analysis. Since waiting times are observed only in Stockholm and over a shorter period, we rely on the estimator in Callaway and Sant'Anna (2021) to increase statistical power.

Panel (a) of Figure 7 shows that SHI reduces waiting times in publicly funded care.[33] The reduction is immediate, persistent, and economically meaningful: three years after enrollment, waiting times are 7.4 days shorter, relative to a baseline of 48 days.

One concern is that the waiting-time estimate reflects selective substitution between care rather than genuine movement within queues for individuals with SHI. Since we control for referral-level diagnosis and type of care, the estimated effects do not reflect differences in case mix or care-seeking behavior. Still, SHI may induce selective substitution toward privately funded and provided care, particularly when public waiting-times are long. To address this concern, Appendix Figure G.3 restricts the analysis to diagnoses and treatments that are provided exclusively within the public system, where such substitution is not possible. The estimated effects remain quantitatively similar, supporting the interpretation that SHI expedites access within the public sector.

Panels (b) to (d) further characterize the reduction in waiting times by examining its distribution, heterogeneity across diagnoses, and underlying mechanisms. Panel (b)

[33] Appendix Figure G.2 replicates the analysis using our baseline research design and yields very similar results.

of Figure 7 shows that the average effects are driven by a substantial increase in the likelihood of receiving care within seven days and a corresponding reduction in long waits of three weeks and more. Thus, SHI primarily reduces the incidence of long delays rather than marginally shortening already short waits. Panel (c) further shows that effects are systematically larger for diagnoses with longer baseline waits and are small or absent for conditions with short baseline waits. Panel (d) adds evidence on a mechanism through which SHI affects waiting times. In the public system, access to specialist and hospital care is mediated through referrals, and referring physicians can flag cases for priority review. Using the referral-level data, we find that patients with SHI are significantly more likely to have their referrals prioritized (Panel (b) of Appendix Figure G.2). Moreover, high-income individuals are more likely to receive prioritized referrals and experience larger waiting-time reductions due to SHI.

In sum, SHI affects not only the utilization of public healthcare utilization but also the speed at which it is delivered. Importantly, in a capacity-constrained system, faster access for some patients necessarily implies slower access for others. While we do not directly observe how one individual's enrollment affects the waiting times faced by other patients, the patterns above are difficult to reconcile with explanations based on excess capacity or efficiency gains. Waiting-time reductions are concentrated precisely in the most congested parts of the system, and SHI patients are more likely to receive prioritized referrals, allowing them to move ahead in existing queues. These patterns thus suggest that SHI operates primarily by reallocating scarce capacity across patients rather than expanding it. This interpretation is also consistent with institutional evidence: a substantial share of procedures in the Swedish public healthcare system is not performed within the legally mandated time frame, reflecting persistent capacity constraints.[34]

VI SHI Incidence: Consumer Surplus and Welfare

This final sections brings together our empirical estimates to quantify the consumer surplus and externalities generated by SHI. We develop a stylized framework in which, in a capacity-constrained public healthcare system, SHI not only expands access to care for enrollees but also reallocates scarce healthcare resources access patients. As a result, SHI generates both private gains and social spillovers. We then study our empirical estimates to quantify these components and assess how they vary across income groups.

[34] Appendix Figure G.4 uses region-level data for all Swedish regions on the share of procedures performed within the statutory 90-day guarantee. Although descriptive, the figure indicates substantial capacity constraints, as a sizeable fraction of patients do not receive care within the mandated time frame.

VI.A Conceptual Framework

We introduce a stylized framework to map changes in healthcare utilization and waiting times into welfare. The key feature of the environment is that access to care is rationed through waiting times rather than prices, so that changes in utilization and queue positions jointly determine welfare.

Individual Preferences Let individual utility be given by $u(q, w, z)$, where q denotes total healthcare consumption, w the associated waiting time, and z out-of-pocket expenditures. We assume quasi-linearity in expenditures and that the marginal value of healthcare depends on waiting times:

$$\frac{\partial u}{\partial q} = v'(q) + \lambda(\tilde{w} - w),$$
$$\frac{\partial u}{\partial w} = -\lambda q.$$

The parameter $\lambda > 0$ captures the marginal disutility of waiting. The parameter $\tilde{w}$ denotes a reference waiting time at which the marginal value of care equals $v'(q)$. The marginal value of healthcare is higher when waiting times are shorter, and the marginal value of reducing waiting times is increasing in healthcare utilization. We normalize $\frac{\partial u}{\partial z} = -1$.

Healthcare can be consumed in the public ($j = 0$) or private ($j = 1$) sector, with corresponding consumption q^j and waiting times w^j, where $q = q^0 + q^1$. We assume

$$\frac{\partial u}{\partial q^j} = v'(q) + \lambda(\tilde{w} - w^j), \qquad \frac{\partial u}{\partial w^j} = -\lambda q^j.$$

We use the waiting time in the public healthcare sector as the reference waiting time for expressing the value of care, implying $\tilde{w} = w^0$. Under this normalization, the willingness to trade off publicly provided healthcare for reductions in waiting time is given by

$$\frac{\partial u/\partial w}{\partial u/\partial q} = \frac{\lambda q}{v'(q)},$$

which we interpret as the willingness to give up healthcare in the public sector in exchange for faster access by one unit.

Healthcare Costs and Capacity Constraints Public healthcare is produced at cost $C(Q^0, w^0)$, where Q^0 denotes aggregate public healthcare utilization. We assume

$$\frac{\partial C}{\partial Q^0} = \zeta'(Q^0) + \mu(\bar{w} - w^0),$$
$$\frac{\partial C}{\partial w^0} = -\mu Q^0,$$

where μ captures the capacity constraints of the public healthcare system. The higher μ, the more costly it is to reduce waiting times, but also the more costly it is to expand care, while keeping waiting times constant. Indeed, we assume that the cost of expanding care reflects on the one hand direct resource costs, $\zeta'(Q^0)$ (e.g., treatments and drugs), and on the other hand, the costs to keep average waiting times constant $\mu(\bar{w} - w^0)$ (e.g., additional staff or equipment). By analogy to the individuals' preferences, we denote by $\bar{w}$ the reference waiting time at which the system could expand care and keep the waiting time constant at zero extra cost. Hence, it seems reasonable to assume that $\mu > 0$ and $\bar{w} > w^0$.

This structure implies that changes in utilization and waiting times due to SHI generate social costs that are not internalized by individuals, creating scope for externalities.

Consumer Surplus Enrollment in SHI affects welfare through three channels: increased utilization, reduced waiting times, and changes in out-of-pocket payments. We approximate the resulting gain in consumer surplus by

$$\Delta u_S \approx v'(q)\Delta q_S - \Delta z_S - \lambda q^0 \Delta w_S^0 + \lambda(w^0 - w^1)\Delta q_S^1, \tag{4}$$

where subscript S denotes SHI enrollment. We interpret this utility gain, expressed in monetary units, as consumer surplus. The first term captures the value of additional care, the second reflects reduced out-of-pocket payments, and the remaining terms capture the value of faster access - both through shorter waiting times in the public system and through substitution toward faster private care.

For the implementation, we assume that the marginal value of care equals one ($v'(q) = 1$) and use existing estimates of willingness-to-pay for reductions in waiting from Russo (2023).

Externalities Enrollment in SHI also generates externalities beyond the enrollee. First, increased utilization raises publicly financed healthcare costs, which we refer to as the *cost externality*. Second, in a capacity-constrained system, faster access for SHI enrollees

must come at the expense of longer waiting times for others. This reallocation of scarce capacity generates a *congestion externality* borne by non-enrollees.

Formally, the cost externality is given by

$$\Delta C \approx \zeta'(Q^0)\Delta Q_S^0 + \mu(\bar{w} - w^0)\Delta Q_S^0. \tag{5}$$

These costs are driven by the expansion of care, but also include the costs to keep average waiting times constant.

If capacity is fixed, faster access for SHI enrollees implies longer waiting times for others. Imposing that total resources are constant, $dC = 0$, yields

$$-\mu q_S^0 S \Delta w_S^0 - \mu q_{noS}^0 (1 - S)\Delta w_{noS}^0 = 0,$$

where S now denotes the share of SHI enrollees. The welfare loss for non-enrollees is

$$\Delta u_{noS} \approx \lambda \frac{S}{1 - S} q_S^0 \Delta w_S^0, \tag{6}$$

which captures the congestion externality.

To implement these expressions, we assume that the public system absorbs increased utilization by allowing waiting times for non-enrollees to rise rather than by expanding capacity. Under this assumption,

$$\begin{aligned} \Delta C &\approx \zeta'(Q^0)\Delta Q_S^0, \\ \Delta u_{noS} &\approx \lambda \frac{S}{1 - S} \left[q_S^0 \Delta w_S^0 - (\bar{w} - w_S^0)\Delta q_S^0 \right]. \end{aligned}$$

These expressions do no longer depend on the capacity constraint parameter μ. We normalize $(\bar{w} - w_S^0)/w_S^0 = 1$, implying that accommodating a one-percent increase in utilization is as costly as accommodating a one-percent reduction in waiting times.

VI.B Consumer Surplus and Externalities

We now use the estimates from our empirical analysis to quantify the private benefits and externalities implied by the framework. Importantly, these estimates identify local average treatment effects for individuals whose SHI enrollment is induced by the variation we exploit. In what follows, we apply these estimates to the population of SHI enrollees as a whole, allowing only for heterogeneity by income.

Following Equation 4, consumer surplus associated with SHI consists of three compo-

nents. First, SHI increases healthcare utilization, which we measure using the estimated $t = 3$ change in costs (see Figure 2b) and value at marginal cost (i.e., $v'(q) = 1$). Second, SHI eliminates out-of-pocket payments on inframarginal care. Third, SHI reduces waiting times for both publicly and privately funded care, which we monetize using willingness-to-pay estimates.

Public waiting times fall by 7.4 days following SHI enrollment (Figure 7). For privately financed care, we assume that SHI reduces waiting times from 48 days in the public system (45 days for specialist or hospital care plus three days, which is the typical waiting time to see a general practitioner (GP) and get a referral) to the advertized 7 days under SHI. We convert these reductions into monetary values using the estimates from Russo (2023), who finds that patients are willing to pay $2.5 to reduce waiting by one day. We translate this into a willingness-to-pay per dollar of healthcare cost of $\lambda = 2.5/186 \approx 0.014$, where 186 is the mean total cost of a GP visit in the US (Agency for Healthcare Research and Quality , AHRQ). We scale waiting time reductions by the observed specialist and hospital expenditures at $t = 3$ in the public and private sectors, respectively.

Figure 8 reports the results. The average consumer surplus amounts to approximately 2,000 SEK per year. The largest component arises from the increased healthcare utilization (about 53 percent), while reductions in waiting times also contribute substantially, especially for publicly funded care. The out-of-pocket coverage component is comparatively small (about 7 percent), reflecting the comprehensiveness of baseline public insurance.

Our hedonic approach to measuring consumer surplus is simple and ignores various demand factors including risk preferences. Still, the estimated value is comparable to observed premiums in the individual SHI market.

We next quantify externalities in Figure 8. The cost externality amounts to 716 SEK per year (calculated as the total healthcare cost increase times the share that is borne by the public system, reported in Figure 6), reflecting increased publicly funded care. The congestion externality amounts to 470 SEK per year. This captures the cost of longer waiting times for non-enrollees due to the increased and expedited care for enrollees. Again, this estimate assumes that the public healthcare system is at capacity, but can be scaled down if the healthcare system were to absorb the impact of SHI at lower cost.

In sum, these results reveal a substantial wedge between private and social value. While enrollees experience sizeable gains from increased access to care and shorter waiting times, almost two thirds of these gains are offset by external costs imposed on the public system and on other patients. This misalignment between private incentives and social costs suggests scope for corrective policy. In particular, the presence of sizeable externalities stands in contrast to the historically subsidized treatment of SHI in Sweden — such as

its provision as a tax-free fringe benefit — which further amplified the wedge between private and social value.

VI.C Distributional Analysis

We next examine how the consumer surplus and externalities of SHI are distributed across the income distribution. We partition individuals into quartiles of disposable income measured prior to SHI enrollment (as in Section IV.D). Figure 9 reports how consumer surplus and externalities vary across income groups.[35]

Panel (a) shows that average consumer surplus is similar across income groups, but its composition differs markedly. For lower-income individuals, the value of SHI primarily reflects increased healthcare utilization, consistent with these individuals being more tightly constrained by non-price rationing in the public system. For higher-income individuals, in contrast, the gains are driven predominantly by reductions in waiting times, consistent with a higher opportunity cost of delays.

Panel (b) shows that the associated externalities mirror these patterns. The expansion of care among lower-income enrollees contributes relatively more to the cost externality, while the waiting-time gains among higher-income enrollees translate into larger congestion costs imposed on others. These differences highlight that SHI operates along distinct margins across the income distribution - expanding access for some, while primarily accelerating access for others.

To assess the overall incidence, we combine group-specific consumer surplus and externalities with differences in SHI coverage rates. Aggregate consumer surplus for income group g is given by

$$CS_g = S_g \cdot \Delta u_{g,S}, \tag{7}$$

where S_g is the share of individuals with SHI. Congestion externalities are borne by the uninsured and allocated across income groups in proportion to healthcare utilization among uninsured. Let Δu_{noS} denote the average congestion externality for the uninsured and $q^0_{g,\text{noS}}$ denote public healthcare utilization among uninsured individuals in group g.

[35]For each income group g, we compute average consumer surplus $E[\Delta u_S]$, allowing the following components to vary by income: (i) SHI-induced healthcare utilization; (ii) changes in waiting times for publicly funded care; (iii) the value of public and private specialist and hospital expenditures; and (iv) the amount of pre-SHI privately funded care that becomes insured. The willingness-to-pay parameter λ is held fixed across income groups at baseline. Appendix H explores robustness to alternative assumptions, including heterogenous λ and valuations based on contractual waiting-time compensation (SEK 300 per day).

The congestion burden borne by group g is then

$$X_g^w = \frac{(1 - S_g)\, q^0_{g,\text{noS}}}{\sum_{\tilde{g}} (1 - S_{\tilde{g}})\, q^0_{\tilde{g},\text{noS}}} \cdot \Delta u_{\text{noS}}. \tag{8}$$

We assume that cost externality is shared equally across the population,

$$X_g^q = S \cdot \Delta q^0, \tag{9}$$

where S is the overall SHI enrollment rate and Δq^0 is the per-insured increase in public healthcare consumption.

Panel (c) shows the strong income gradient SHI coverage, S_g. Panel (d) combines the components with the SHI enrollment measures to estimate the net value for each group:

$$\Delta W_g = CS_g - (X_g^w + X_g^q). \tag{10}$$

This resulting incidence is strongly regressive. Net welfare effects are negative for the lowest income quartile, as relatively few individuals benefit from SHI while many bear the congestion costs. In contrast, net gains increase steeply with income and reach approximately 370 SEK for the top quartile. Although average effects remain modest due to the low overall coverage rate, the distributional pattern is stark.

Appendix table H.2 shows that this regressive pattern is robust to alternative assumptions. Allowing for heterogenous valuations of waiting times or using contractual compensation values of SEK 300 per day as an alternative way to evaluate waiting times increases the estimated gains at the top without materially improving outcomes at the bottom.[36] Similarly, counterfactual changes in SHI coverage show that equilizing enrollment rates largely equalizes incidence, whereas increasing overall coverage while maintaining the income gradient amplifies the regressive effects.

Taken together, these findings show that SHI generates substantial private value but distributes it unevenly across the population. In a system where access is rationed through waiting times, SHI reallocates care toward those with coverage while imposing costs on those without. As a result, both the benefits and the externalities of SHI are distributed regressively.

[36]The contractual compensation of SEK 300 per day is taken directly from the terms and conditions governing SHI.

VII Conclusion

This paper studies the role of supplemental private health insurance in a universal healthcare system with non-price rationing. Using administrative data from Sweden and variation in employer-provided coverage, we document three main findings.

First, SHI enrollment is highly unequal, increasing sharply with income despite greater healthcare needs among lower-income individuals. Second, SHI substantially increases healthcare utilization and improves access to high-value care, including earlier cancer detection and improved survival. Third, these effects materialize largely within the public system: SHI crowds in publicly funded care and reduces waiting times for enrollees, implying congestion and fiscal externalities in a capacity-constrained setting.

Taken together, our findings highlight a central tension. SHI can improve access by relaxing rationing constraints, but when coverage is unequally distributed and tightly integrated with publicly financed care, it can exacerbate inequality and distort the allocation of care. Individuals who stand to gain the most from improved access are the least likely to be covered.

A limitation of our analysis is that we do not observe how the expansion of SHI affects the supply of care. If the supply of physicians is fixed, a shift toward privately financed access may reduce effective capacity in the public system and amplify congestion effects. If instead supply is elastic, such responses may not affect the interaction between the public system and the private supplemental health insurance market. Understanding how provider supply responds to the growth of supplemental insurance is therefore an important direction for future research.

More broadly, our results show that in rationed systems, private insurance does not operate in parallel to the public sector—it reshapes access within it.

References

Abaluck, Jason, Mauricio Caceres Bravo, Peter Hull, and Amanda Starc, "Mortality effects and choice across private health insurance plans," *The Quarterly Journal of Economics*, 2021, *136* (3), 1557–1610.

Agency for Healthcare Research and Quality (AHRQ), "Health Insurance Coverage: Findings from the Medical Expenditure Panel Survey, Statistical Brief #517," Medical Expenditure Panel Survey (MEPS), U.S. Department of Health and Human Services 2024. Accessed February 5, 2026.

American Joint Committee on Cancer, *AJCC Cancer Staging Manual*, 8 ed., New York: Springer, 2017.

Atkinson, Anthony B. and Joseph E. Stiglitz, "The Design of Tax Structure: Direct versus Indirect Taxation," *Journal of Public Economics*, 1976, *6* (1–2), 55–75.

Barros, Pedro Pita and Xavier Martinez-Giralt, "Public and Private Provision of Health Care," *Journal of Economics & Management Strategy*, 2002, *11* (1), 109–133.

Bensnes, Simon S, Ingrid Huitfeldt, and Victoria Marone, "The Distributional Effects of Cost-Sharing in a Universal Healthcare System," Technical Report, National Bureau of Economic Research 2026.

Besley, Timothy, "Publicly provided disaster insurance for health and the control of moral hazard," *Journal of Public Economics*, 1989, *39* (2), 141–156.

_ , James Hall, and Ian Preston, "The Demand for Private Health Insurance: Do Waiting Lists Matter?," *Journal of Public Economics*, 1999, *72* (2), 155–181.

Blomqvist, Åke and Per-Olov Johansson, "Economic efficiency and mixed public/private insurance," *Journal of Public Economics*, 1997, *66* (3), 505–516.

Boone, Jan, "Basic versus supplementary health insurance: Moral hazard and adverse selection," *Journal of Public Economics*, 2015, *128*, 50–58.

Brot-Goldberg, Zarek C, Amitabh Chandra, Benjamin R Handel, and Jonathan T Kolstad, "What does a deductible do? The impact of cost-sharing on health care prices, quantities, and spending dynamics," *The Quarterly Journal of Economics*, 2017, *132* (3), 1261–1318.

_ , Samantha Burn, Timothy Layton, and Boris Vabson, "Rationing medicine through bureaucracy: authorization restrictions in Medicare," Technical Report, National Bureau of Economic Research 2023.

Buchmueller, Thomas C., Agnes Couffinhal, Michel Grignon, and Maxime Perronnin, "Access to Physician Services: Does Supplemental Insurance Matter? Evidence from France," *Health Economics*, 2004, *13* (7), 669–687.

Cabral, Marika and Neale Mahoney, "Externalities and taxation of supplemental insurance: A study of Medicare and Medigap," *American Economic Journal: Applied Economics*, 2019, *11* (2), 37–73.

Callaway, Brantly and Pedro HC Sant'Anna, "Difference-in-differences with multiple time periods," *Journal of econometrics*, 2021, *225* (2), 200–230.

Case, Anne and Angus Deaton, "Rising Morbidity and Mortality in Midlife among White Non-Hispanic Americans in the 21st Century," *Proceedings of the National Academy of Sciences*, 2015, *112* (49), 15078–15083.

Cesarini, David, Erik Lindqvist, Robert Östling, and Björn Wallace, "Wealth, Health, and Child Development: Evidence from Administrative Data on Swedish Lottery Players," *The Quarterly Journal of Economics*, May 2016, *131* (2), 687–738.

Chetty, Raj, John N. Friedman, Emmanuel Saez, Nicholas Turner, and Danny Yagan, "Income Segregation and Intergenerational Mobility Across Colleges in the United States," *Quarterly Journal of Economics*, 2020, *135* (3), 1567–1633.

_ , Michael Stepner, Sarah Abraham, Shelby Lin, Benjamin Scuderi, Nicholas Turner, Augustin Bergeron, and David Cutler, "The association between income and life expectancy in the United States, 2001-2014," *Jama*, 2016, *315* (16), 1750–1766.

Cooper, Zack, Stuart V. Craig, Martin Gaynor, and John Van Reenen, "The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured," *The Quarterly Journal of Economics*, 2019, *134* (1), 51–107.

Cutler, David M, "Equality, efficiency, and market fundamentals: the dynamics of international medical-care reform," *Journal of economic literature*, 2002, *40* (3), 881–906.

Cutler, David M. and Jonathan Gruber, "Does Public Insurance Crowd Out Private Insurance?," *The Quarterly Journal of Economics*, 1996, *111* (2), 391–430.

Danesh, Kaveh, Jonathan T. Kolstad, William D. Parker, and Johannes Spinnewijn, "The Chronic Disease Index: Analyzing Health Inequalities Over the Lifecycle," NBER Working Paper 32577, National Bureau of Economic Research 2024.

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux, "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica*, 1996, *64* (5), 1001–1044.

Einav, Liran, Amy Finkelstein, and Mark R. Cullen, "Estimating Welfare in Insurance Markets Using Variation in Prices," *Quarterly Journal of Economics*, 2010, *125* (3), 877–921.

_ and _ , "Moral Hazard in Health Insurance: What We Know and How We Know It," *Journal of the European Economic Association*, 2018, *16* (4), 957–985.

_ and _ , *We've Got You Covered: Rebooting American Health Care*, New York, NY: Portfolio / Penguin, 2023.

Fadlon, Itzik and Torben Heien Nielsen, "Family Labor Supply Responses to Severe Health Shocks: Evidence from Danish Administrative Records," *American Economic Journal: Applied Economics*, July 2021, *13* (3), 1–30.

Fang, Hanming, Michael Keane, and Dan Silverman, "Disentangling Moral Hazard and Adverse Selection from Dynamic Insurance Data," *American Economic Review*, 2008, *98* (1), 147–185.

Ferey, Antoine, Benjamin B. Lockwood, and Dmitry Taubinsky, "Sufficient Statistics for Nonlinear Tax Systems with General Across-Income Heterogeneity," *American Economic Review*, 2024, *114* (10), 3206–3249.

Finkelstein, Amy, "The Aggregate Effects of Health Insurance: Evidence from the Introduction of Medicare," *Quarterly Journal of Economics*, 2007, *122* (1), 1–37.

_ , Sarah Taubman, Bill Wright, Mira Bernstein, Jonathan Gruber, Joseph P. Newhouse, Heidi Allen, and Katherine Baicker, "The Oregon Health Insurance Experiment: Evidence from the First Year," *The Quarterly Journal of Economics*, 2012, *127* (3), 1057–1106.

Fleitas, Sebastián, Caitlyn Fleming, Gautam Gowrisankaran, and Anthony T Lo Sasso, "Group Health Insurance Versus ACA Marketplaces: Selection, Subsidies, and Welfare," Technical Report, National Bureau of Economic Research 2025.

Geruso, Michael and Timothy J. Layton, "Selection in Health Insurance Markets and Its Policy Remedies," *Journal of Economic Perspectives*, 2017, *31* (4), 23–50.

_ , Timothy Layton, and Adam Leive, "The Incidence of Adverse Selection: Theory and Evidence from Health Insurance Choices," NBER Working Paper 31435, National Bureau of Economic Research 2023.

Godøy, Anna, Venke F Haaland, Ingrid Huitfeldt, and Mark Votruba, "Hospital queues, patient health, and labor supply," *American Economic Journal: Economic Policy*, 2024, *16* (2), 150–181.

Gravelle, Hugh and Luigi Siciliani, "Optimal quality, waits and charges in health insurance," *Journal of Health Economics*, 2008, *27* (3), 663–674.

Hackmann, Martin, Jonathan Kolstad, and Amanda Kowalski, "Adverse Selection in Health Insurance: Evidence from an Employer-Provided Market," *American Economic Review*, 2015, *105* (9), 3049–3082.

Hagen, Johannes, Lisa Laun, Charlotte Lucke, and Mårten Palme, "The rising income gradient in life expectancy in Sweden over six decades," *Proceedings of the National Academy of Sciences*, 2025, *122* (14), e2418145122.

Handel, Benjamin, Jonathan Kolstad, Thomas Minten, and Johannes Spinnewijn, "The Socioeconomic Distribution of Choice Quality: Evidence from Health Insurance in the Netherlands," *American Economic Review: Insights*, 2024, *6* (3), 395–412.

Hanning, Marianne, "Väntetider – den svenska hälso- och sjukvårdens akilleshäl," *Socialmedicinsk tidskrift*, 2022, *3*, 383–394. Documents long-standing waiting time problems and their relation to supply-demand imbalances.

Hendren, Nathaniel, Camille Landais, and Johannes Spinnewijn, "Choice in insurance markets: A Pigouvian approach to social insurance design," *Annual Review of Economics*, 2021, *13*, 457–486.

Hermo, Santiago, Miika Päällysaho, David Seim, and Jesse M Shapiro, "Labor market returns and the evolution of cognitive skills: Theory and evidence," *The Quarterly Journal of Economics*, 2022, *137* (4), 2309–2361.

Hoel, Michael and Erik Magnus Sæther, "Public Health Care with Waiting Time: The Role of Supplementary Private Health Care," *Journal of Health Economics*, 2003, *22* (4), 599–616.

Kiil, Astrid and Jacob Nielsen Arendt, "The Effect of Complementary Private Health Insurance on the Use of Health Care Services," *International Journal of Health Economics and Management*, 2017, *17* (1), 1–27.

Kullberg, Linn, Paula Blomqvist, and Ulrika Winblad, "Health insurance for the healthy? Voluntary health insurance in Sweden," *Health Policy*, 2019, *123* (8), 737–746.

Lavaste, Konsta, "Private health insurance in the universal public healthcare system: The role of healthcare provision in Finland," *Health Policy*, 2023, *132* (5), 104820.

Layton, Timothy J., Nicole Maestas, Daniel Prinz, and Boris Vabson, "Health care rationing in public insurance programs: Evidence from Medicaid," *American Economic Journal: Economic Policy*, 2022, *14* (4), 397–431.

Lindqvist, Erik and Roine Vestman, "The labor market returns to cognitive and noncognitive ability: Evidence from the Swedish enlistment," *American Economic Journal: Applied Economics*, 2011, *3* (1), 101–128.

Ludvigsson, Jonas F., David Bergman, Catharina Ihre Lundgren, Kristina Sundquist, Jean-Luc af Geijerstam, Anna H. Glenngård, Marie Lindh, Johan Sundström, Johan Kaarme, and Jialu Yao, "The healthcare system in Sweden," *European Journal of Epidemiology*, 2025, *40* (5), 563–579.

Manning, Willard G., Joseph P. Newhouse, Naihua Duan, Emmett B. Keeler, and Arleen Leibowitz, "Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment," *American Economic Review*, 1987, *77* (3), 251–277.

Nekoei, Arash and David Seim, "How Do Inheritances Shape Wealth Inequality? Theory and Evidence From Sweden," *The Review of Economic Studies*, 2023, *90* (1), 463–498.

Nilsson, Anton and Alexander Paul, "Patient cost-sharing, socioeconomic status, and children's health care utilization," *Journal of Health Economics*, 2018, *59*, 109–124.

OECD, *Private Health Insurance in OECD Countries*, Paris: OECD Publishing, 2004.

_ , *Health at a Glance 2025: OECD Indicators*, Paris: OECD Publishing, 2025.

_ **and European Observatory on Health Systems and Policies**, *Sweden: Country Health Profile 2021* State of Health in the EU, Paris: OECD Publishing, 2021.

_ **and** _ , "Sweden: Country Health Profile 2025," Technical Report, OECD Publishing and the European Observatory on Health Systems and Policies 2025.

Palme, Mårten, "Vem har privat sjukvårdsförsäkring i Sverige? En deskriptiv analys," Technical Report 5, Svensk Försäkring 2017.

Pauly, Mark V., "The Economics of Moral Hazard: Comment," *American Economic Review*, 1968, *58* (3), 531–537.

Pauly, Mark V, "Taxation, health insurance, and market failure in the medical economy," *Journal of economic literature*, 1986, *24* (2), 629–675.

Petretto, Alessandro, "Optimal social health insurance with supplementary private insurance," *Journal of Health Economics*, 1999, *18* (6), 727–745.

Russo, Anna, "Waiting or Paying for Healthcare: Evidence from the Veterans Health Administration," Technical Report, Working Paper 2023.

Seibold, Arthur, Sebastian Seitz, and Sebastian Siegloch, "Privatizing disability insurance," *Econometrica*, 2025, *93* (5), 1697–1737.

Selden, Thomas M., "Should the government provide catastrophic insurance?," *Journal of Public Economics*, 1993, *51* (2), 241–247.

_ , "More on the economic efficiency of mixed public/private insurance," *Journal of Public Economics*, 1997, *66* (3), 517–523.

Shepard, Mark, Katherine Baicker, and Jonathan Skinner, "Does one medicare fit all? the economics of uniform health insurance benefits," *Tax Policy and the Economy*, 2020, *34* (1), 1–41.

Siciliani, Luigi, Michael Borowitz, and Valerie Moran, *Waiting Time Policies in the Health Sector: What Works?*, OECD Publishing, 2013.

Socialdepartementet, "Reglering av privata sjukvårdsförsäkringar," Technical Report Ds 2022:15, Regeringskansliet 2022.

Socialstyrelsen, "Det statistiska registrets framställning och kvalitet: Patientregistret," Technical Report 2022-2-7767, Socialstyrelsen, Stockholm 2022. Version 1.1, publicerad 9 december 2022, reviderad 20 januari 2023.

Statistics Sweden, "System of Health Accounts 2023," Technical Report, Statistics Sweden (SCB) 2025.

Stepner, Michael, "The long-term externalities of short-term disability insurance," Technical Report, Working paper 2019.

Svensk Försäkring, "Behandlingar inom vårdförsäkringen," June 2025. Published 2025-06-03. Accessed: 2026-04-13.

Sveriges Kommuner och Regioner, "Waiting times in healthcare (Väntetider i vården)," Excel data export November 2023. National waiting-time database, extracted 2023-11-03.

Sveriges Kommuner och Regioner (SKR), "Väntetider i vården," `https://extra.skr.se/vantetiderivarden.46246.html` 2026. Accessed January 28, 2026.

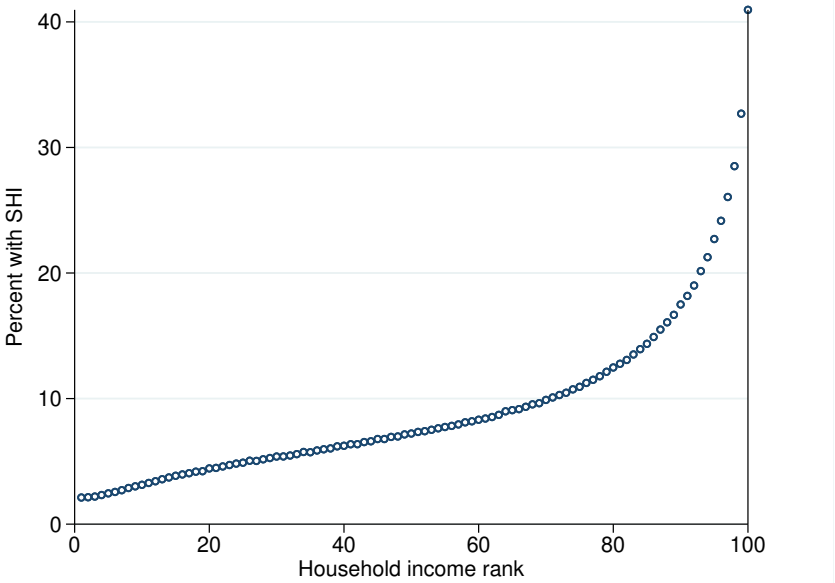
Wagstaff, Adam and Eddy van Doorslaer, "Equity in Health Care Finance and Delivery," in Anthony J. Culyer and Joseph P. Newhouse, eds., *Handbook of Health Economics*, Vol. 1, Elsevier, 2000, pp. 1803–1862.

Yang, Ou, Jongsay Yong, and Yuting Zhang, "Effects of Private Health Insurance on Waiting Time in Public Hospitals," *Health Economics*, 2024, *33* (6), 1192–1210.

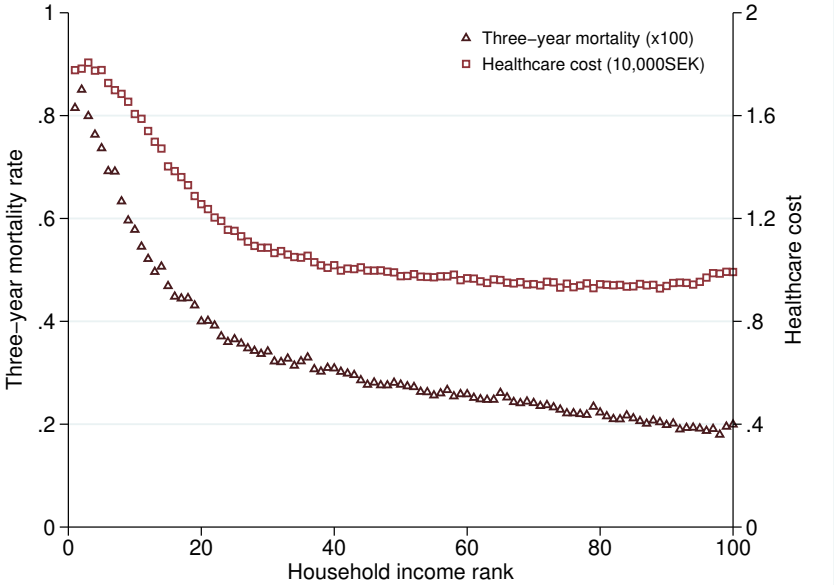
Figures

Figure 1: **Supplementary insurance and health across income**

(a) Supplementary health insurance



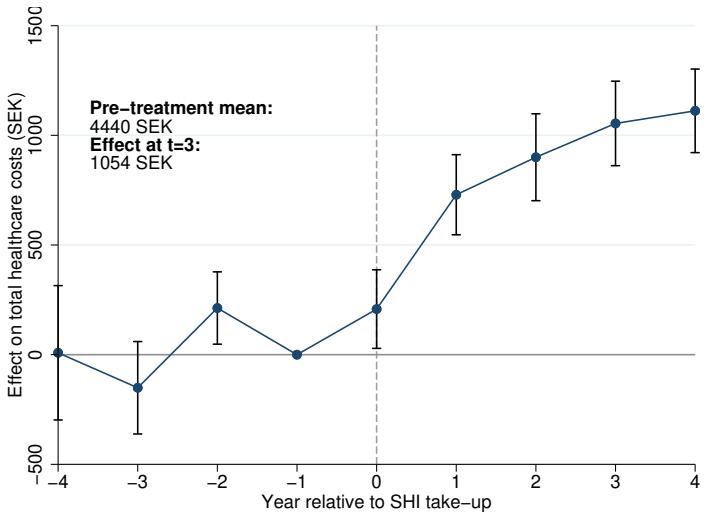
(b) Mortality and health care costs



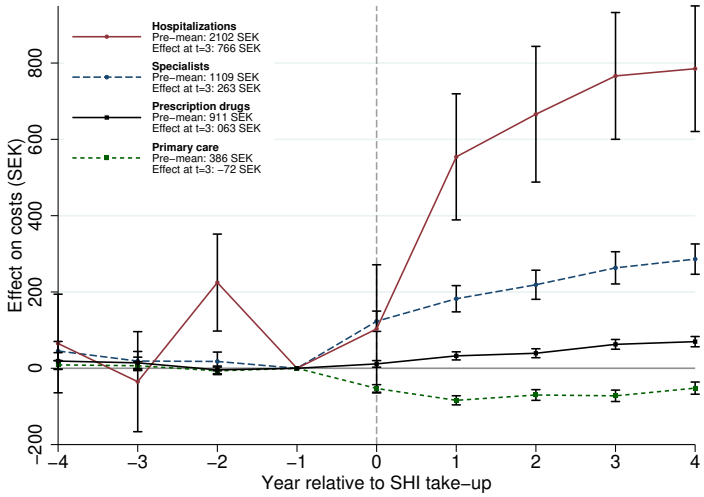
Note: This figure plots SHI coverage in **Panel (a)** and three-year mortality (scaled by 100) as well as mean annual healthcare expenditures (in 10,000 SEK, 8.95 SEK ≈ 1 USD) in **Panel (b)**, each against household disposable income rank for the working-age population (ages 25–65), pooling the years 2008–2015. Three-year mortality is defined over rolling windows; to avoid multiple counting of deaths, we reweight observations so that each individual contributes at most one death across overlapping windows. Healthcare expenditures include all inpatient, outpatient, and prescription drug spending, excluding primary care costs, in a given calendar year. In healthcare data from Stockholm, we observe the average system cost of each procedure at the level of ICD chapter × first procedure code × year. We apply that cost to all specialist and hospital visits in the National Patient Register to obtain cost measures for all visits. Prescription drugs are valued at the shelf price at the time of dispensing. All costs include out-of-pocket costs. Household income rank is based on the sum of disposable household income over the last three years, adjusted for household composition. We rank individuals' income within gender and age (one-year intervals) for ages 25–65. We exclude individuals in the bottom decile to avoid atypical income reporting (e.g., periods abroad or tax-exempt income), inline with Hagen et al. (2025).

Figure 2: **Dynamic effects of SHI on healthcare costs**

(a) Total costs



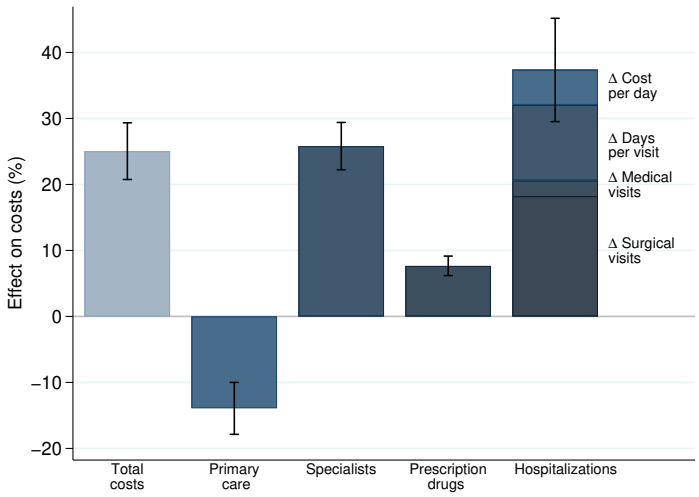
(b) By components



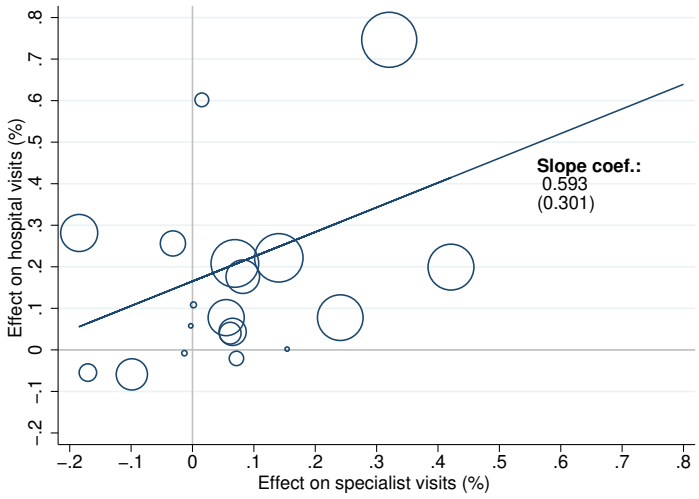
Note: This figure plots the dynamic effects of SHI on healthcare costs. We plot the estimated coefficients from the event-study specification in Equation (1), exploiting variation in the timing of employer-provided SHI. Treated cohorts enroll in SHI during 2007-2010, and control cohorts enroll during 2012-2015. **Panel (a)** reports estimated changes in annual healthcare costs, measured in SEK (8.95 SEK $\approx$ 1 USD), relative to the year prior to SHI enrollment (t = -1). **Panel (b)** decomposes effects on total costs into its components: hospitalizations, specialist visits, prescription drugs, and primary care. Primary care costs are estimated based on the Stockholm sample. When estimating the effects of SHI on total healthcare costs in Panel (a), we first regress the sum of costs for specialist visits, hospitalizations, and prescription drugs using the full sample, and then add the estimated coefficients for primary care costs. In healthcare data from Stockholm, we observe the average system cost of each procedure at the level of the ICD chapter-first procedure code-year. We apply that cost to all specialist and hospital visits in the National Patient Register to obtain cost measures for all visits. Prescription drugs are valued as the shelf price at the time of dispensing. Primary care costs are observed directly for Stockholm. Standard errors for total costs are approximated using the delta method. We estimate effects on prescription drugs including enrollment-cohort fixed effects to account for an unbalanced panel (as these data are observed only in 2006-2015). The 95% confidence intervals are based on standard errors clustered at the individual level.

Figure 3: **Understanding the effect of SHI on costs**

(a) By components



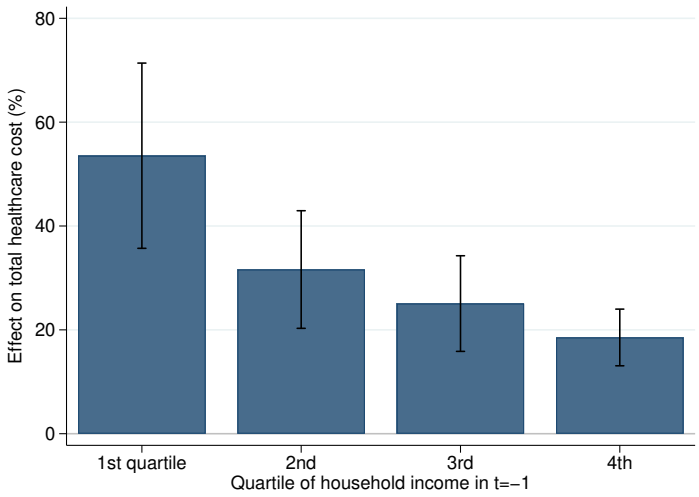
(b) Effect-correlations across ICD-chapters



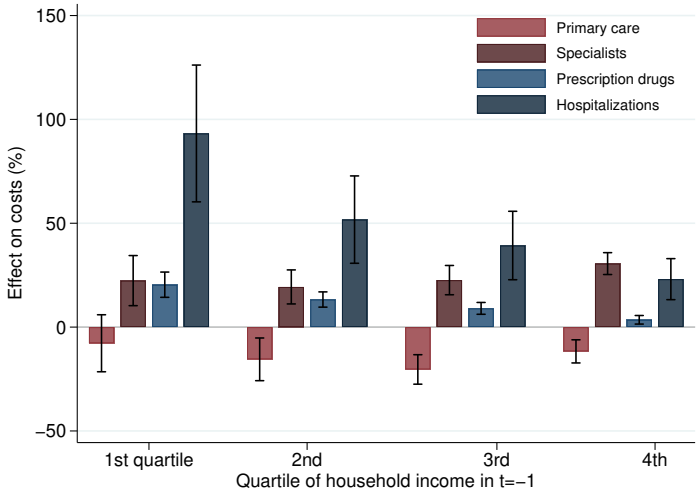
Note: **Panel (a)** reports the estimated event-time-3 coefficients from Equation (1), scaled by the pre-treatment mean ($t = -1$), for all cost measures. We decompose the cost coefficient for hospitalizations into i. the number of visits (which in turn is split into surgical procedures, defined by the Swedish Surgical Procedure (KVÅ) codes that start with three letters, and medical ones, defined by the residual), ii. the length of the visit (in days), and iii. the cost per day. The 95% confidence intervals are based on standard errors clustered at the individual level. In **Panel (b)**, we first regress the number of hospital visits / specialist visits per year within each ICD-chapter on a post SHI dummy-variable (capturing the average effect of SHI in event-years $1-4$) and scale the coefficient by the pre-treatment mean. We plot the estimated treatment effect for hospital visits against that for specialist visits and let the size of the circle be proportional to the lowest absolute value of the t-statistic within the ICD-10 chapter, where the t-statistic is based on standard errors clustered at the individual level. The fitted line, the reported coefficient and standard error represent a regression of hospital visit effects on specialist visit effects among these 19 dots, weighting each observation with the associated t-statistic, applying robust standard errors. Appendix figure E.4 provide the individual estimates by ICD-10 chapter and care modality.

Figure 4: **Heterogeneous effects on costs by income**

(a) Total costs



(b) By components

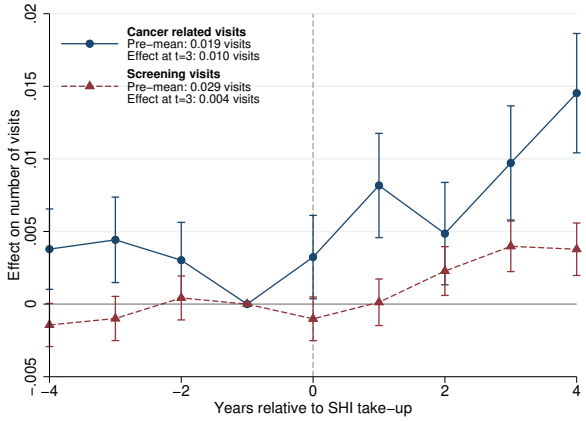


Note: This figure reports the effects of SHI on healthcare costs by quartile of disposable household income measured in the year prior to treatment. **Panel (a)** shows the percentage change in total annual healthcare costs for each income quartile as the event-time-$t = 3$ coefficients scaled by the quartile-specific pre-treatment mean ($t = -1$), analogously to the left-most bar in Figure 3a. The income ranks are constructed in the same way as in Figure 1. **Panel (b)** decomposes these effects into primary care, specialist visits, prescription drugs, and hospitalizations. Estimates are event-time-3 coefficients, scaled by the group-specific pre-treatment mean ($t = -1$). The 95% confidence intervals are based on standard errors clustered at the individual level.

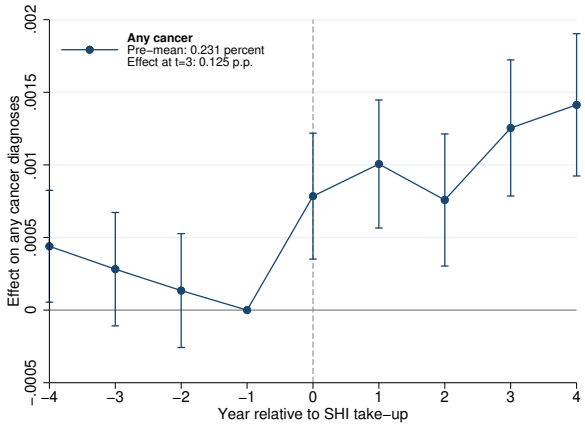
Figure 5: **Effect of SHI on cancer care, diagnosis, stage, and mortality**

Baseline estimator

(a) Screening and cancer care

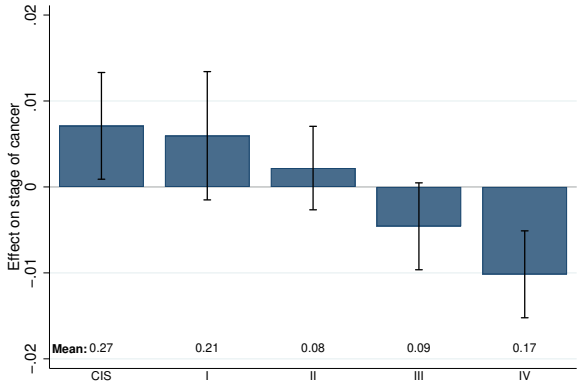


(b) Pr(cancer diagnoses)

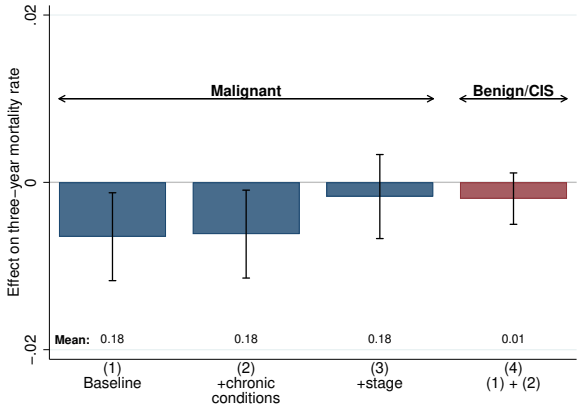


OLS estimator | cancer diagnoses

(c) Stage at diagnoses

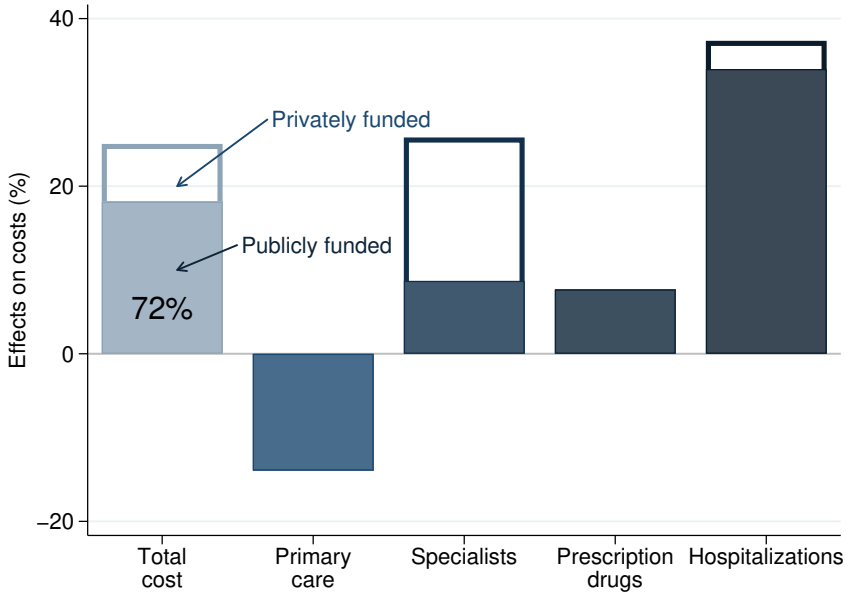


(d) Three-year mortality



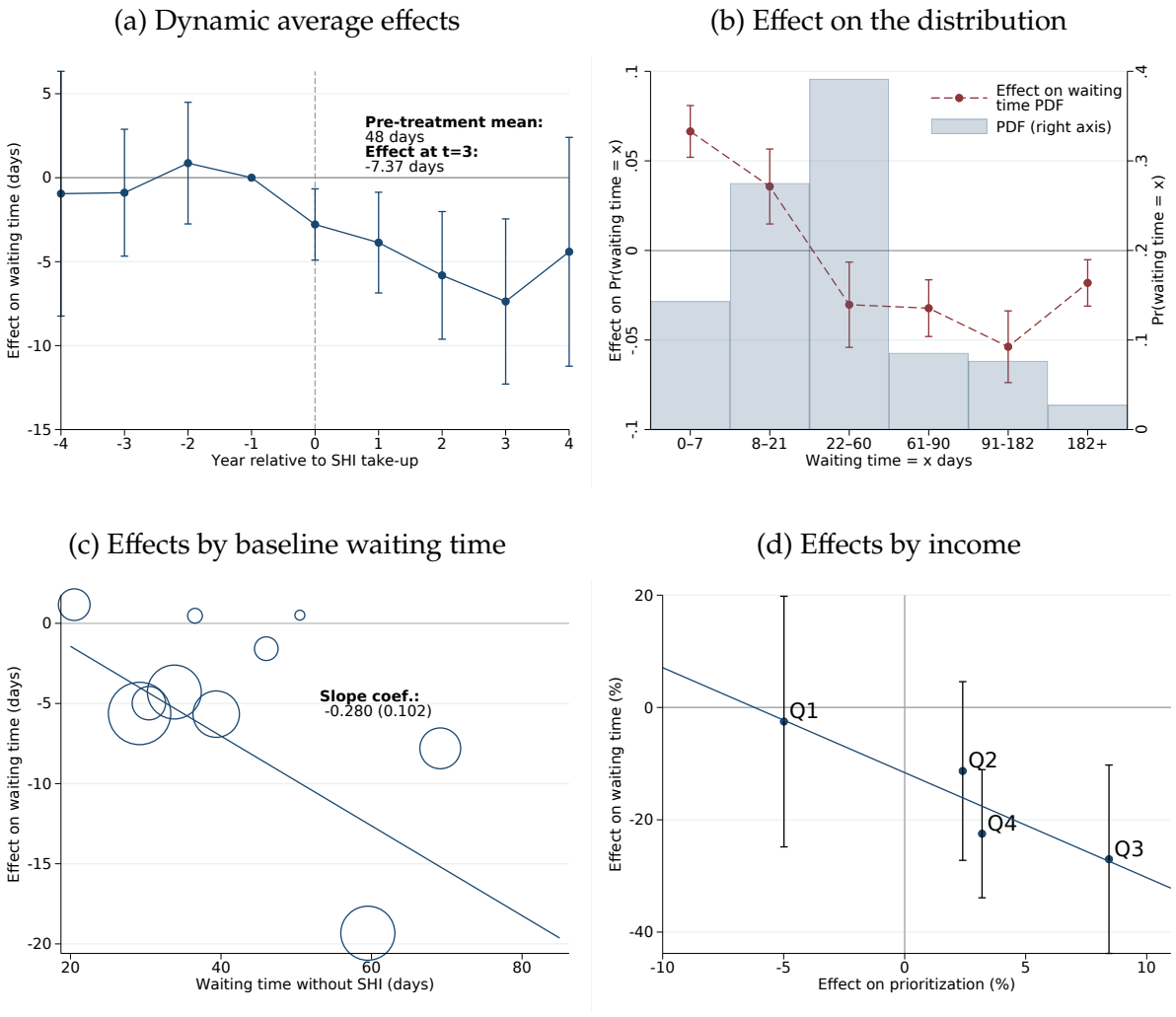
Note: This figure reports effects on cancer-related outcomes. Panels (a) and (b) are estimated using our main specification (Equation (1)). The bars correspond to the estimated β coefficients, and we also report each coefficient scaled by the pre-treatment mean. Ninety-five percent confidence intervals are based on standard errors clustered at the individual level. The left bar in **Panel (a)** reports the annual number of screening visits, defined as specialist or hospital visits with ICD-10 codes Z00–Z04 or Z10–Z13. These codes capture general health check-ups, preventive examinations, and screening activities during which suspicion of cancer is commonly formed. The right bar reports the effect on cancer-related specialist and hospital visits, defined as visits with ICD-10 codes C00–C99, D00–D10, and D37–D48 (malignant neoplasms, carcinoma in situ, and neoplasms of uncertain or unknown behavior, respectively). **Panel (b)** reports dynamic effects of SHI enrollment on the probability of being diagnosed with cancer, defined as a entry in the National Cancer Register. The figure plots event-time coefficients relative to the year prior to SHI take-up. **Panels (c)** and **(d)** report OLS estimates of the association between SHI and stage at cancer diagnosis and three-year all-cause mortality, respectively. We estimate β-estimates from: $y_i = \alpha + \beta 1(SHI_i) + X_i\gamma + \varepsilon_i$, where $1(\text{SHI}_i)$ is an indicator for having any SHI in the year prior to diagnosis (including employer-provided as well as group or individually purchased plans, to increase statistical power). Cancer stage for solid tumors is defined according to American Joint Committee on Cancer (2017). Hematologic cancers, central nervous system tumors, and unstageable solid tumors accounts for 18 percent of malignant cases. All specifications include baseline controls for year, age, gender, region of residence (21 regions), household disposable income rank (100 percentiles), and education (four categories) and cancer site (using ICD-O codes). Panel (c) first shows the effect on stage at diagnoses, where stages are ordered from earliest to latest. In Panel (d) the outcome is three year mortality for malignant (blue) and benign/CIS (maroon) tumors. The first bar show the baseline estimate. The second specification additionally controls for 22 indicators of chronic conditions, defined based on prescription drug use in $t = -1$ and $t = -2$ following Danesh et al. (2024). The third bar include stage at diagnosis. The fourth bar show the effect on benign tumors and CIS. The sample consists of individuals aged 25–63 with a first tumor diagnosis between 2007 and 2015 who were employed at a firm with at least five employees in the year prior to diagnosis. Ninety-five percent confidence intervals are based on robust standard errors.

Figure 6: **Cost externalities of SHI**



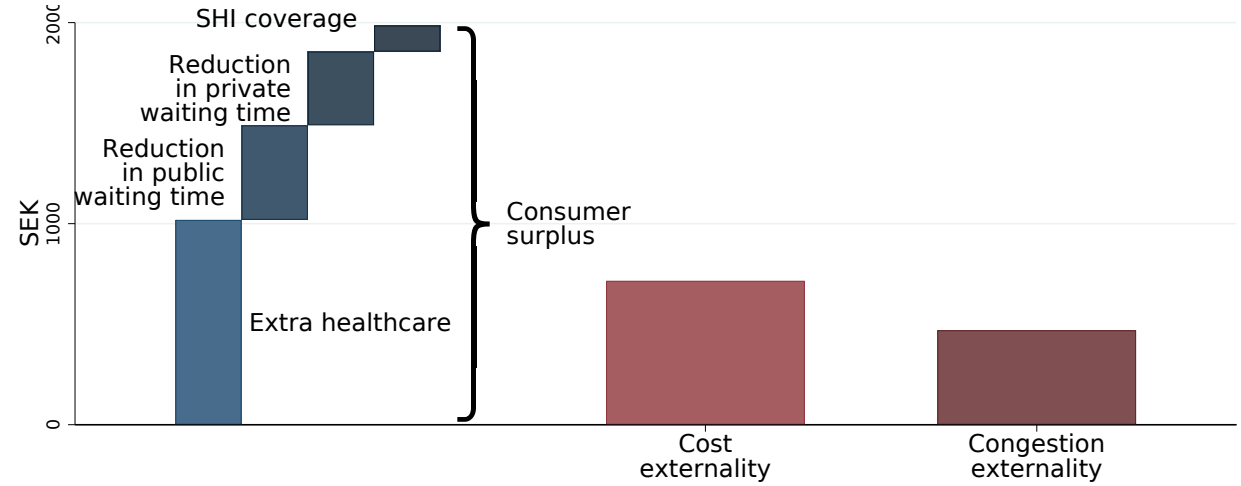
Note: This figure decomposes the estimated effect of SHI on annual healthcare expenditures from Figure 3a into public and private funding. The height of each bar is split into a shaded region – publicly funded spending – and a hollow region – privately funded spending. We create these as follows. First, we estimate Equation (1) in the Stockholm data component-by-component and splitting by whether the funding is private or public. We then compute the effect share that is private, separately across event time. We retrieve the event-time-3 shares and scale the national estimates with that share. Appendix Figure 32 shows that baseline estimates of the overall effect of SHI on healthcare costs in the national sample are quantitatively similar to those in the Stockholm sample. Figure E.8a reports the dynamic effects on privately- and publicly funded care using Equation (1), and Figure E.8b shows the funding decomposition, both using the Stockholm sample.

Figure 7: **Effect of SHI on waiting times in the public system**



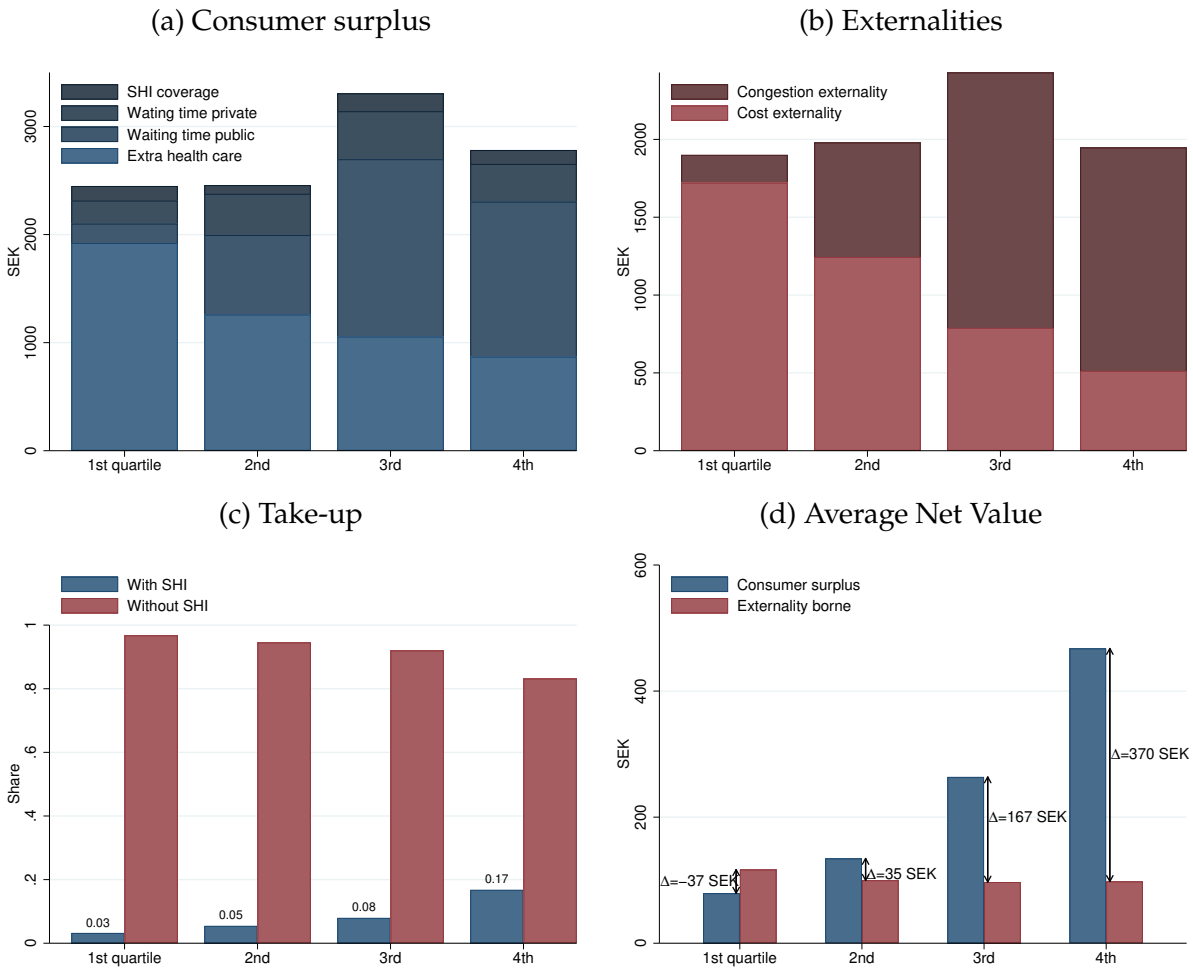
Note: This figure shows the effect of SHI on waiting times for publicly funded care using referral data from Stockholm. **Panel (a)** plots the dynamic average treatment effects of SHI on waiting times per referral in the years surrounding SHI take-up. **Panel (b)** reports the $t = 3$-estimates on the probability of experiencing different waiting-time durations in publicly funded care. The maroon dots represent the estimated coefficients, and the shaded bars display the empirical distribution of waiting times, measured for individuals without SHI between the years 2008 and 2015. **Panel (c)** plots the $t = 3$-coefficients against the average waiting time among the non-SHI population between 2008 and 2015. We start by grouping the data on waiting times from the referral data into forty groups by medical specialty (such as oncology, gynecology, and orthopedics). We then divide those further into ten groups by the average waiting time. We finally estimate the effect of SHI on waiting times within these ten groups. The size of each circle is proportional to the magnitude of the t-statistic of each estimate. The fitted line represents a regression of effect sizes on average waiting times, weighted by the t-statistic. An increase in the waiting time by one day is associated with a decrease in the effect of 0.28 days. **Panel (d)** plots estimates of the event-time-3 effect of SHI on (i) waiting times per referral and (ii) the probability of having a prioritized referral, separately by quartile of disposable income, scaled by the pre-treatment mean ($t = -1$) in each quartile. Income quartiles are measures in the same year as the referral and are based on disposable household income, just as in Figure 1. For each quartile, we then plot the estimates against each other together with 95% confidence intervals retrieved from the waiting time effect. The p-values for the Q1–Q4 prioritization estimates are 0.334, 0.606, 0.009, and 0.120, respectively. All panels are estimated by pooling never-treated and later-treated units along Callaway and Sant'Anna (2021). This allows us to include more treatment years (2009-2014) and expand the control group, thereby increasing statistical power. The unit of observation is a referral. An individual may contribute multiple referrals per year. All specifications include controls for age, gender, household disposable-income percentile (1–100), education (four categories), referral type (treatment/diagnostic/consultation), and medical specialty (e.g. oncology or orthopedics). 95% confidence intervals based on robust standard errors.

Figure 8: **Consumer surplus and externalities of SHI**



Note: This figure shows average consumer surplus for SHI enrollees, Δu_S, and the per-insured externalities of SHI per year (excluding premiums). The first bar measures total consumer surplus as the sum of three components: (i) the additional healthcare due to SHI, measured as the estimated event-time-3 change in total healthcare costs (1,020 SEK), obtained by summing the component estimates in Figure 2b; (ii) the monetized value of waiting-time reductions; and (iii) the $t = -1$ private care that becomes covered by SHI. We monetize the value of waiting times as follows: (a) Panel (a) of Figure 7 reports a change in waiting times in publicly funded care of $\Delta w_{\text{public}} = -7.4$ days. For privately funded care, we set $\Delta w_{\text{private}} = 7 - (45 + 3) = -41$ days, where 45 days is the average waiting time to specialists and hospitals in the public system and 3 days is the typical waiting time to see a GP and obtain a referral. Seven days is the advertised waiting time under SHI. (b) We use the willingness-to-pay estimate from Russo (2023), where patients are on average willing to pay \$2.5 for one day shorter waiting time. We translate this into a willingness-to-pay per healthcare-cost unit of $\lambda^w = 2.5/186 \approx 0.014$, where \$186 is the mean total cost of a GP visit in the US (Agency for Healthcare Research and Quality , AHRQ). We use this parameter to convert waiting-time reductions into value terms as $value^w_{\text{public}} = \lambda^w \cdot \Delta w_{\text{public}}$ and $value^w_{\text{private}} = \lambda^w \cdot \Delta w_{\text{private}}$. (c) Finally, we scale the monetized value of waiting time by the event-time-3 cost of publicly funded specialist and hospitalization care (4,743 SEK) and privately funded specialist and hospitalization care (699 SEK), respectively. The two maroon bars to the right report the externalities imposed by SHI coverage on the public system. The cost externality is 716 SEK per insured per year and is calculated as the total healthcare cost increase times the share that is borne by the public system, as reported in Figure 6. The congestion externality is 470 SEK per insured per year and reflects the monetized waiting-time loss imposed on uninsured individuals. Table H.1 provides details about each component.

Figure 9: **Consumer surplus, externalities, and net values by income**



Note: **Panel (a)** reports average consumer surplus by quartile of disposable income, $\Delta u_{g,S}$, calculated in the same way as in Figure 8 but with income-group-specific components. Disposable income is measured as in Figure 4 at event time $t = -1$. We allow the following components to vary by disposable-income quartile: (i) the additional healthcare consumed with SHI (Figure 4); (ii) the change in waiting times for publicly funded care (Figure 7d); (iii) the value of public and private specialist and hospital care; and (iv) the amount of pre-SHI privately funded care that becomes covered by SHI. We hold the value of waiting time, λ^w, fixed at the level used in Figure 8. **Panel (b)** reports the average cost and congestion externalities imposed by each SHI holder, separately by income quartile. **Panel (c)** shows the share of individuals with and without SHI by income quartile. **Panel (d)** reports aggregate consumer surplus, the externalities borne, and the resulting net value of the SHI market (abstracting from premiums paid), separately by income. Aggregate consumer surplus (navy-colored bars) is $CS_g = S_g \cdot \Delta u_{g,S}$, where S_g is reported in Panel (c) and $\Delta u_{g,S}$ in Panel (a). We compute aggregate cost externalities (maroon bars) under the assumption that these costs are shared equally across the population: $X_g^q = S \cdot \Delta q^0$, where S is overall SHI enrollment and Δq^0 is the per-insured increase in publicly funded healthcare spending. We assume that congestion externalities are borne by the uninsured. Let Δu_{noS} denote the average congestion externality for the uninsured and $q^0_{g,\text{noS}}$ denote public healthcare utilization among uninsured individuals in group g. The resulting congestion burden is $X_g^w = \frac{(1-S_g)\, q^0_{g,\text{noS}}}{\sum_{h=1}^{4}(1-S_h)\, q^0_{h,\text{noS}}} \cdot \Delta u_{\text{noS}}$. The annotations report net value for each income group: $\Delta W_g = CS_g - (X_g^q + X_g^w)$. Table H.2 provides robustness and counterfactual analysis.

Tables

Table 1: Drivers of the income gradient in SHI take-up

	Outcome: Supplementary health insurance			
Panel (a): Full sample				
	(1)	(2)	(3)	(4)
Quintile 2	0.021 (0.0002)	0.018 (0.0002)	0.006 (0.0001)	0.004 (0.0001)
Quintile 3	0.040 (0.0002)	0.035 (0.0002)	0.015 (0.0001)	0.009 (0.0001)
Quintile 4	0.069 (0.0002)	0.063 (0.0002)	0.029 (0.0002)	0.018 (0.0002)
Quintile 5	0.168 (0.0004)	0.162 (0.0004)	0.084 (0.0003)	0.060 (0.0003)
Chronic FEs	No	Yes	Yes	Yes
Firm FEs	No	No	Yes	Yes
Occupation FE	No	No	No	Yes
R-Squared	0.041	0.044	0.456	0.471
Observations	34,756,455	34,756,455	34,756,455	34,756,455
Panel (b): Males with IQ scores				
	(1)	(2)	(3)	(4)
Quintile 2	0.009 (0.0004)	0.009 (0.0004)	0.008 (0.0004)	0.008 (0.0004)
Quintile 3	0.018 (0.0004)	0.017 (0.0005)	0.016 (0.0005)	0.015 (0.0005)
Quintile 4	0.032 (0.0005)	0.031 (0.0006)	0.029 (0.0006)	0.028 (0.0006)
Quintile 5	0.085 (0.0006)	0.064 (0.0008)	0.061 (0.0008)	0.060 (0.0008)
Chronic FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes
SES FE	No	Yes	Yes	Yes
Non-cognitive skills FE	No	No	Yes	Yes
Cognitive skills FE	No	No	No	Yes
R-Squared	0.535	0.703	0.703	0.703
Observations	7,646,829	7,646,829	7,646,829	7,646,829

Note: This table reports the association between enrollment in SHI (employer provided, group or individual) in year t and household income rank (in quintiles) in the same year. Household income quintiles are based on the average equivalised disposable household income over the three years preceding year t. To get equivalised disposable household income, we follow Statistics Sweden and divide total disposable household income (the sum of all taxable and non-taxable income minus taxes and other negative transfers) by the household's consumption weight to adjust for household size and composition, using a modified version of the OECD equivalence scale (weights: 1.00 for single adults; 1.51 for cohabiting couples; $+0.60$ for each additional adult; $+0.52$ for the first child aged 0–19; and $+0.42$ for subsequent children aged 0–19). The omitted reference income level is quintile 1. Across columns, we sequentially add covariates. Chronic conditions are 22 indicators for having filled a certain prescription in $t = -1$ and $t = -2$. (See Appendix table C.2 for details). Firm fixed effects denote dummies for the primary employer in year t. We include a dummy for unemployment. Occupations are measure using one-digit SSYK codes (major occupational classes), including a catch all indicator for those who are employed but with missing information about occupation. Skill measures include cognitive and non-cognitive ability scores obtained at military enlistment at age 18. Cognitive ability is measured as the within-cohort rank of the sum of test scores along four subtests: synonyms, inductions, metal folding, and technical comprehension. Non-cognitive ability is measured as a score ranging 1-5 on four traits: social maturity, intensity, psychological energy, and emotional stability. We use these raw non-cognitive scores in the analysis. Lindqvist and Vestman (2011) and Hermo et al. (2022) provide detailed information about these cognitive and non-cognitive ability scores. Socioeconomic status (SES FE) includes measures of cohort-specific wealth quintiles, based on the three-year average of individual wealth between 2004-2006, and highest completed level of education at time t (less than high school, high school, post-secondary vocational, or university education). The sample covers 2008–2015. Panel (a) includes the full population of working-age individuals with complete covariate information. Panel (b) restricts the sample to males with available cognitive-ability scores from enlistment, i.e. birth cohorts 1951–1975, for whom military service was mandatory. Differences in sample size across specifications arise because observations in cells with no within-cell variation in treatment, or that become perfectly collinear after absorbing high-dimensional fixed effects, do not contribute to identification and are therefore dropped. Standard errors are clustered at the individual level.

Appendix

A Institutions

I.A Public Health Care and Patient Cost Sharing

Sweden's health care system is predominantly tax financed and administered by regional governments. Public care is available at regulated user fees that are low relative to the cost of treatment. Co-payments for primary care and outpatient specialist visits typically range from 100 to 300 SEK and are subject to an annual cap of approximately 1,200 SEK. Public inpatient hospital care costs 80–150 SEK per night.

Prescription drugs are covered under a separate cost-sharing schedule. Patients pay the full cost up to 900 SEK (in 2010 prices), followed by coinsurance rates of 50, 25, and 10 percent at successive expenditure thresholds, until reaching an annual out-of-pocket maximum of 1,800 SEK. Health care and pharmaceutical expenditures are tracked over a rolling 365-day period.

I.B Waiting Times and Access to Care

Because direct prices in the public system are low, access to care is primarily regulated through waiting times rather than financial barriers. The Swedish *vårdgaranti* specifies maximum waiting times: patients should be able to see a primary-care physician within three days, obtain a specialist consultation within 90 days, and initiate treatment within the following 90 days.

In practice, waiting times frequently exceed these guarantees, and unmet need is largely driven by delays in access rather than out-of-pocket costs (OECD and European Observatory on Health Systems and Policies, 2025). Historical and policy analyses describe waiting times as a structural feature of the system, reflecting imbalances between supply and demand under fixed short-run capacity (Hanning, 2022; Ludvigsson et al., 2025). National statistics show that 31% of patients do not receive a specialist consultation within the statutory waiting time and 34% do not initiate treatment within the subsequent 90 days (Sveriges Kommuner och Regioner , SKR). In our data from Region Stockholm, the average waiting time from referral to specialist or hospital care is approximately 48 days.

I.C Supplementary Private Health Insurance

Supplementary private health insurance (SHI) provides faster access to specialist consultations and elective treatment, typically through private providers operating outside the public waiting lists. The main value of SHI therefore lies in reduced waiting times rather than financial protection.

Premiums vary with age and contract characteristics. Individual policies may require a health declaration at entry, allowing insurers to screen applicants based on pre-existing conditions. Published insurance contracts indicate substantial variation in premiums across age groups and coverage types.

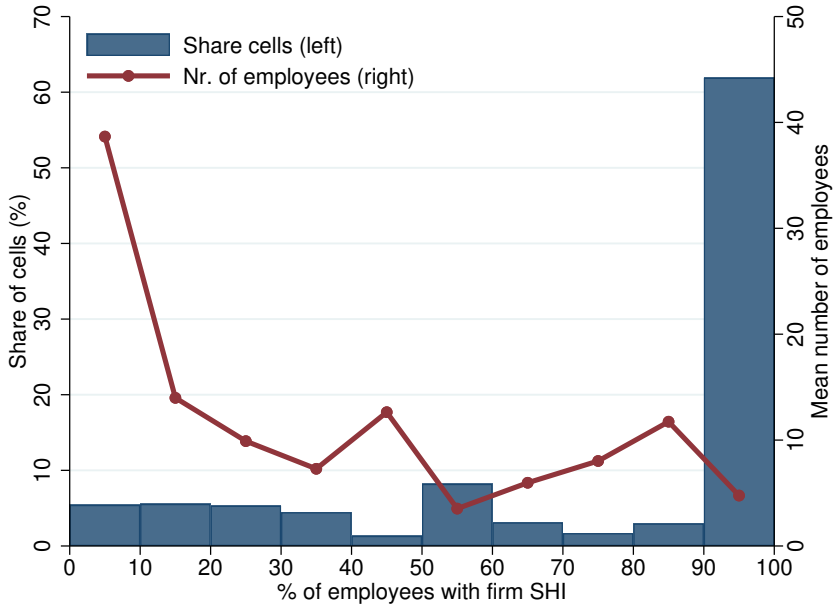
I.D Employer-Sponsored SHI

During the period we study, the Swedish SHI market was dominated by employer-sponsored contracts. Employers can purchase coverage for their workforce by submitting employees' personal identification numbers to an insurer through an online interface. These identifiers contain information on year of birth, which insurers use to determine premiums based on the age composition of the workforce.

Employees do not actively enroll; instead, employers enroll eligible workers directly. Eligibility requires that employees have full work capacity at the time of enrollment (Kullberg et al., 2019). Employer-sponsored SHI premiums were treated as a tax-free fringe benefit during our study period.

Employer-sponsored SHI plays a central role in our empirical design because coverage decisions are made at the employer level while access to treatment operates at the individual level.

Figure A.1: **Share of employees with SHI**



Note: This figure shows the distribution of the share of employees enrolled in firm-provided SHI over the period 2007–2015. A cell is defined at the firm x plant x occupation x year level, where occupations are measured at the 2-digit SSYK level. We exclude observation with missing SSYK codes and restrict the sample to: (i) cells with at least one employee enrolled in SHI, and; (ii) firms with at least 10 employees. Bars report the share of cells (in percent) in each bin of the SHI coverage distribution, while the line plots the mean number of employees per cell (right axis). The mean enrollment rate across cells is close to 80%.

I.E Private Health Insurance around the world

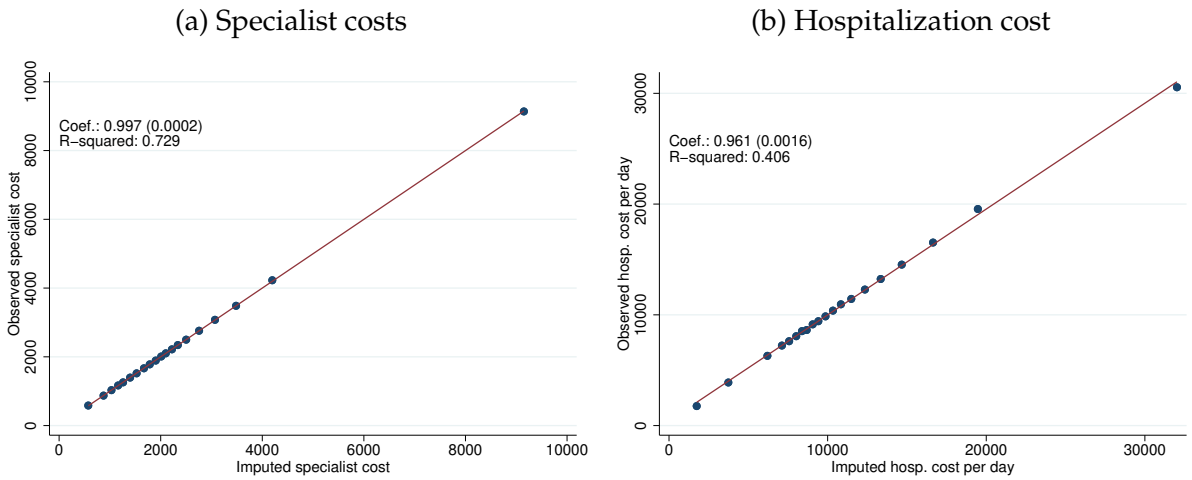
Table A.1: Private health insurance coverage and public system type

Country	Type of private health insurance	Type of public health system	Average PHI coverage
Finland	Supplementary (additional PHI alongside public and occupational care)	National Health Service with occupational tier (tax-financed)	∼20%
Denmark	Complementary and supplementary	National Health Service (tax-financed)	∼40–42%
Norway	Supplementary (mainly employer-paid)	National Health Service (tax-financed)	∼9–10%
Sweden	Supplementary (limited fast-access cover)	National Health Service (tax-financed)	∼10%
United Kingdom	Supplementary (private medical insurance)	National Health Service (tax-financed)	∼11–12%
Ireland	Supplementary (private hospital and specialist access)	Mixed system (tax-financed public + private access)	∼45%
France	Complementary (mutuelles covering co-payments)	Social Health Insurance (contribution-financed)	∼95%
Belgium	Complementary and supplementary	Social Health Insurance (contribution-financed)	∼85%
Netherlands	Complementary (outside mandatory basic package)	Mandatory regulated private insurance (SHI-type)	∼85%
Germany	Duplicate/substitutive (full private for eligible) and supplementary	Social Health Insurance with opt-out for high earners	∼11% (fully private)
Switzerland	Supplementary (on top of mandatory basic insurance)	Mandatory individual insurance (regulated private)	∼70% (supplementary)
Australia	Supplementary and duplicate (private hospital cover)	National Health Service (Medicare, tax-financed)	∼55%
Canada	Supplementary (employment-based for drugs and dental)	National Health Insurance (single payer, tax-financed)	∼65%
New Zealand	Supplementary (private hospital and specialist access)	National Health Service (tax-financed)	∼35%
United States	Primary private insurance (dominant coverage source)	Mixed system (private + Medicare/Medicaid)	∼65%

Note: Approximate population coverage rates are based on OECD *Health at a Glance*, OECD and European Observatory country health profiles, and Commonwealth Fund international system summaries. *Supplementary* insurance improves access or choice relative to the public system; *complementary* insurance covers statutory co-payments; *duplicate/substitutive* insurance covers services also included in the public benefit package or substitutes for public coverage. Public system types follow standard comparative health system classifications.

B Data

Figure B.1: **Imputed prices**

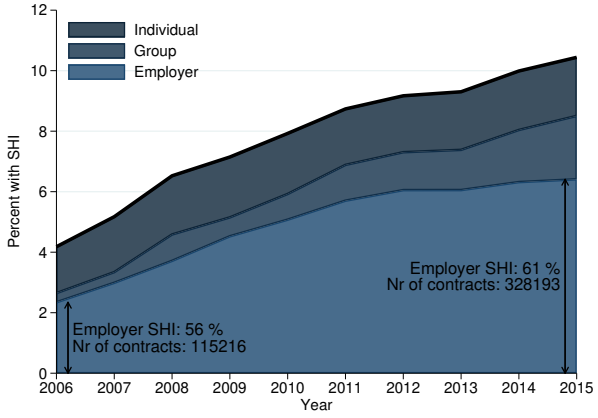


Note: This figure compares imputed costs to observed costs for specialist visits (Panel a) and hospitalizations (Panel b). The sample consists of individuals observed in the Stockholm billing data between 2003 and 2018. Average prices are calculated using an 80 percent sample, defined at the level of three-digit ICD diagnosis codes, procedure codes (KVÅ), and calendar year. These averages are then applied to a 20 percent holdout sample to generate imputed prices, which are plotted against observed prices in the figure. Each point represents the mean observed and imputed price using 20 equal sized bins. The solid line depicts the fitted linear relationship between imputed and observed prices; reported coefficients and R-squared values are from regressions of observed prices on imputed prices in the holdout sample.

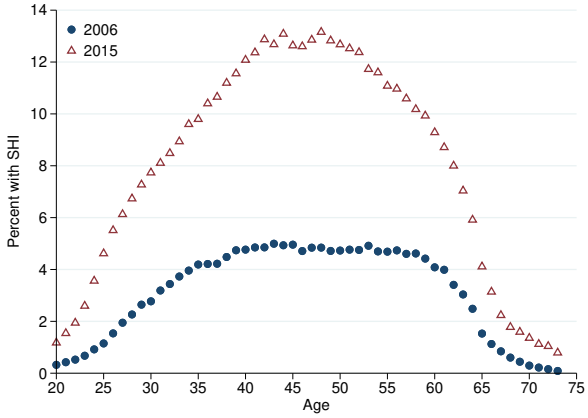
C Enrollment in SHI

Figure C.1: **SHI coverage over time and age**

(a) Take-up over time



(b) Take-up and age



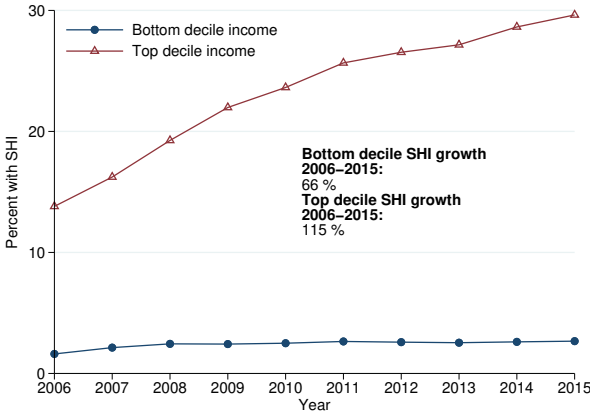
Note: **Panel (a)** reports the share of the working-age population (ages 26-65) enrolled in SHI between 2006 and 2015, decomposed into individual, group, and employer-provided contracts. The solid black line represents total SHI coverage. The figure presents the share and number of employer-provided SHI contracts in 2006 and 2015. **Panel (b)** reports SHI coverage by age, pooling the three insurance types together, for individuals aged 20-74 in 2006 and 2015.

Table C.1: Summary Statistics: SHI vs No SHI

	2007-2010		2011-2015	
	SHI	No SHI	SHI	No SHI
		Demographic		
Age	45.08	45.36	45.23	45.12
Female	0.34	0.51	0.35	0.51
Immigrant	0.11	0.16	0.12	0.17
Spouse	0.69	0.59	0.68	0.57
Nr. children	0.84	0.65	0.83	0.65
Less than high school	0.10	0.20	0.08	0.18
High school	0.41	0.43	0.39	0.43
Vocational educ.	0.17	0.15	0.17	0.15
University educ.	0.32	0.23	0.35	0.25
Disp. income rank	71.63	54.24	71.67	54.15
Wealth rank 2006	62.16	50.35	57.79	47.05
		Labor market		
Labor income	446.90	249.18	487.00	278.06
Tenure (0-5 years)	3.27	3.29	3.36	3.32
Any unemployment	0.02	0.07	0.01	0.06
Sick-leave days	5.43	11.02	6.83	13.37
		Geographic		
Stockholm	0.30	0.22	0.30	0.22
Gothenburg	0.21	0.17	0.20	0.17
Malmo	0.10	0.13	0.10	0.13
		Health		
Specialist visits	0.75	1.03	0.99	1.20
Hospitalizations	0.08	0.12	0.07	0.12
Specialist cost	3.71	6.04	3.75	5.76
Hospital cost	1.60	1.97	2.37	2.72
Prescription drug cost	1.74	2.82	1.85	2.88
Observations	1,000,358	12,112,181	2,246,600	19,548,971

Note: This table reports mean characteristics for individuals with and without SHI. The sample includes working age (25-65 years old) individuals. Sick-leave includes spells longer than 14 days provided by the public sick-leave insurance. Wealth and household disposable income percentile ranks are within birth cohort and year in the Swedish population. All monetary values are measured in kSEK.

Figure C.2: **SHI over time by household disp. income**



Note: This figure reports the share of the working-age population (ages 26-65) enrolled in SHI between 2006 and 2015, separately for households in the bottom and top disposable income deciles, pooling the three insurance types together. Household income rank is based on the sum of disposable household income over the last three years, adjusted for household composition. We rank all individuals' income in ages 25-65 within gender and age (one-year intervals). We exclude individuals in the bottom decile before making the income ranks to avoid atypical income reporting (e.g., periods abroad or tax-exempt income) along the lines of Hagen et al. (2025).

Table C.2: Chronic conditions

Chronic Disease	**ATC Code(s)**
Acid related disorders	A02
Bone diseases (osteoporosis)	M05
Cancer	L01
Cardiovascular diseases (inc. hypertension)	B01A, C01, C04A, C02, C07, C08, C09
Dementia	N06D
Diabetes (mellitus)	A10A, A10B, A10X
Epilepsy	N03
Glaucoma	S01E
Gout (Hyperuricemia)	M04
HIV	J05A
Hyperlipidemia	C10
Intestinal (inflammatory) diseases	A07E
(Iron deficiency) anemia	B03A
Migraines	N02C
Pain	N02A, N02B
Parkinson's disease	N04, N05B, N05C
Psychological disorders	N06A
Psychoses	N05A
Respiratory illnesses	R03
Rheumatological conditions	L04A
Thyroid disorders	H03
Tuberculosis	J04A

Note: This table presents the categorization of chronic conditions based on ATC codes from the Swedish Prescribed Drug Register following Danesh et al. (2024). We define an individual as having a specific chronic condition if a drug within the relevant ATC category has been dispensed in two consecutive years prior to the index year.

Table C.3: Advantageous selection

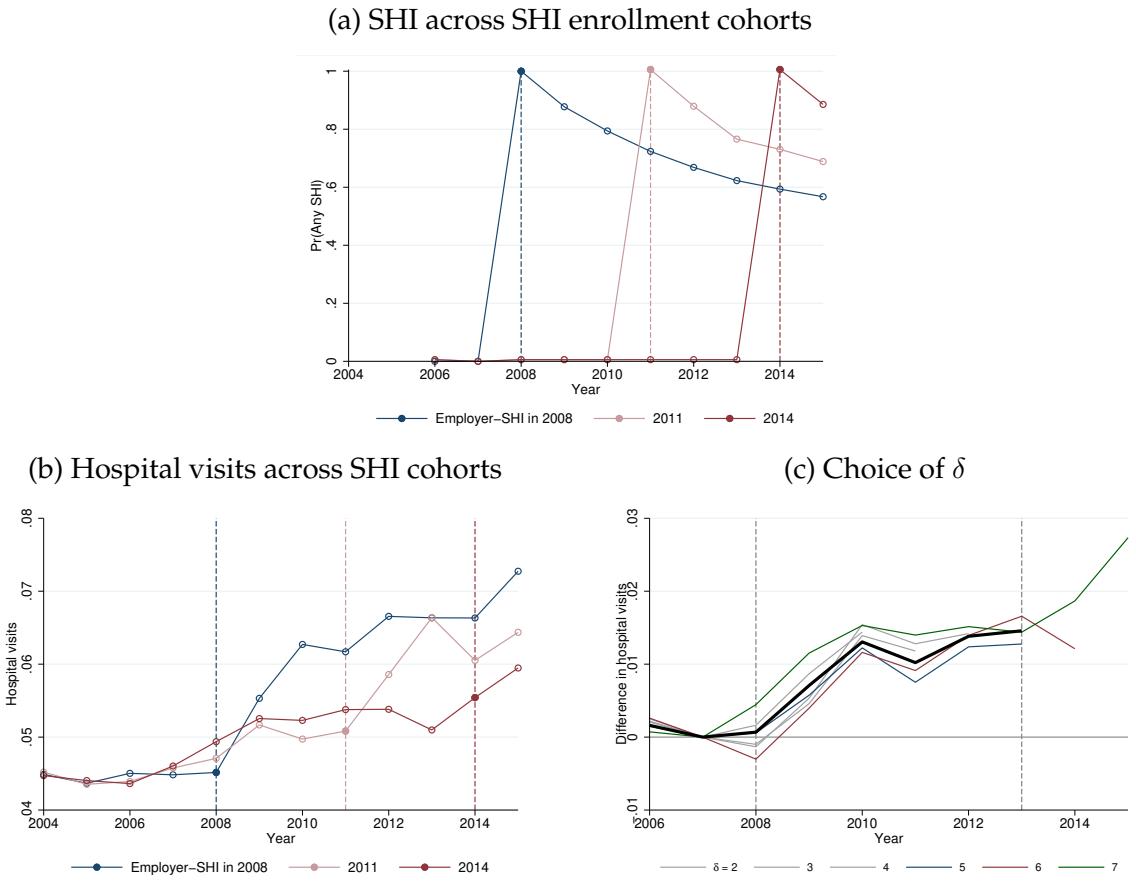
Panel (a): Full sample	Outcome: Healthcare cost		
	(1)	(2)	(3)
SHI	-2,918	-1,959	-1,281
	(34)	(34)	(41)
Constant	11,106	11,016	10,936
	(16)	(15)	(12)
Gender FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income	No	Yes	Yes
SES	No	No	Yes
R-Squared	0.004	0.006	0.114
Observations	34,908,110	34,908,110	34,844,586

Panel (b): Males with IQ scores	(1)	(2)	(3)
	All	Low IQ	High IQ
SHI	-992	-1,128	-656
	(70)	(123)	(86)
Constant	9,431	10,701	8,081
	(20)	(28)	(26)
Gender FE	No	No	No
Age FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income	Yes	Yes	Yes
SES	Yes	Yes	Yes
R-Squared	0.154	0.161	0.175
Observations	8,384,624	4,234,739	4,149,045

Note: This table reports the association between annual healthcare expenditures in year t and an indicator for having SHI in the same year (individual-, group-, or employer-provided). Healthcare expenditures include inpatient care, specialist outpatient care, and prescription drugs, but exclude primary care. For healthcare visits, we observe average system costs in the Stockholm area at the level of ICD chapter x first procedure code x year, which are applied to all specialist and hospital visits in the National Patient Register to construct national cost measures. Prescription drugs are valued at the shelf price at the time of dispensing. All costs include out-of-pocket payments. Across columns, we sequentially expand the set of covariates. Income is measured as the household disposable income rank over the previous three years. Socioeconomic status (SES FE) includes measures of cohort-specific wealth quintiles, based on the three-year average of individual wealth between 2004–2006, and highest completed level of education at time t (less than high school, high school, post-secondary vocational education, or university education). The sample covers 2008–2015. Panel (a) uses the full population of working-age individuals (ages 25–65) for whom all covariates are observed. Panel (b) restricts the sample to males with available military enlistment data, limited to birth cohorts 1951–1975, when enlistment was mandatory. Column (1) in Panel (b) replicates Column (3) in Panel (a); Columns (2)–(3) split the sample at the median cognitive-ability score. Cognitive ability scores are obtained at military enlistment at age 18 and are measured as the within-cohort rank of the sum of test scores across four subtests: synonyms, inductions, metal folding, and technical comprehension. Standard errors are clustered at the individual level.

D Design

Figure D.1: **Empirical design and choice of δ**



Note: This figure illustrates our empirical design. **Panel (a)** plots the share of individuals covered by any SHI by calendar year, separately for cohorts who receive employer-provided SHI for the first time in 2008, 2011, and 2014. We restrict attention to those who work at the firm that provides SHI in the enrollment year, are in ages 25-63 at the time of enrollment, and do not have any SHI prior to receiving employer-provided SHI. **Panel (b)** reports the corresponding mean number of hospital visits for each cohort over time. **Panel (c)** displays the mean difference in hospital visits who receive employer-provided SHI in 2008 (treatment group) and various control groups, normalized in 2007. The lines are shown for different δ until the potential control group receives employer-provided SHI (and are treated). The thick black line represents the difference using $\delta \geq 5$ years, which is used in the baseline analysis.

Table D.1: Summary statistics: main analytic sample

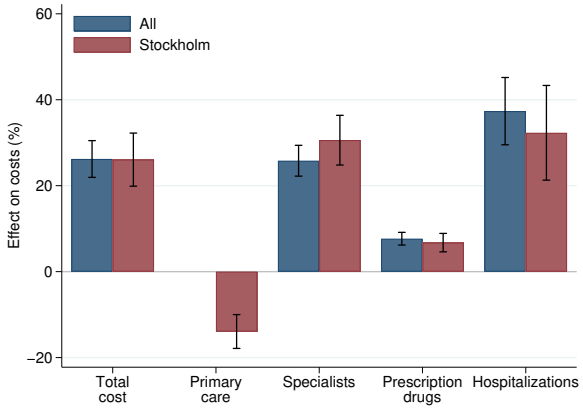
SHI cohort:	2007		2008		2009		2010	
	Treated	Control	Treated	Control	Treated	Control	Treated	Control
				Demographic				
Age	38.99	38.47	39.36	38.84	40.07	39.58	39.41	39.02
Female	0.35	0.35	0.34	0.34	0.36	0.36	0.33	0.33
Immigrant	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Spouse	0.57	0.57	0.58	0.57	0.60	0.59	0.58	0.58
Nr. children	0.85	0.88	0.85	0.87	0.87	0.88	0.88	0.88
Less than high school	0.08	0.09	0.10	0.09	0.09	0.09	0.09	0.08
High school	0.39	0.42	0.41	0.43	0.41	0.42	0.39	0.42
Vocational educ.	0.18	0.19	0.18	0.19	0.18	0.19	0.18	0.19
University educ.	0.35	0.30	0.32	0.29	0.32	0.30	0.35	0.30
HH income rank	66.04	65.11	64.43	64.16	65.70	64.96	65.68	65.52
Wealth rank 2006	56.47	55.00	54.49	53.50	54.66	53.11	52.70	51.20
				Labor market				
Labor income	361.02	353.37	364.54	360.64	392.00	386.16	387.23	386.58
Tenure (0-5 years)	2.63	2.62	2.58	2.56	2.66	2.62	2.59	2.59
Any unemployment	0.07	0.07	0.05	0.05	0.03	0.04	0.06	0.07
Sick-leave days	4.98	5.54	4.99	5.27	4.60	4.91	3.55	3.71
				Geographic				
Stocholm	0.33	0.32	0.32	0.31	0.30	0.32	0.32	0.33
Gothenburg	0.17	0.18	0.18	0.19	0.20	0.19	0.19	0.20
Malmo	0.10	0.11	0.11	0.11	0.11	0.11	0.10	0.12
Observations	38,341	194,845	40,544	127,321	29,817	75,674	29,430	22,971

Note: This table reports descriptive statistics for the treatment and control groups in the main estimation sample. All variables are measured at $t = -1$. Monetary variables are expressed in thousands of SEK. Sick leave includes spells exceeding 14 days covered by the public sick-leave insurance system. Household disposable income rank and wealth rank are measured as percentile ranks within birth cohort and calendar year (2006 for wealth) in the Swedish population. The comparison groups are reweighted to match the joint distribution of covariates in the treatment group with respect to gender, age, labor income decile, and job tenure as described in Section . The resulting weights range from 0.03 to 20.11.

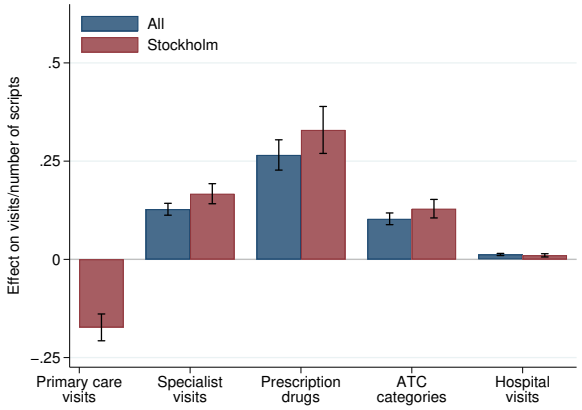
E Effects of SHI

Figure E.1: **Effects of SHI: Full sample versus Stockholm**

(a) Effect on costs



(b) Effect on visits and prescription drugs

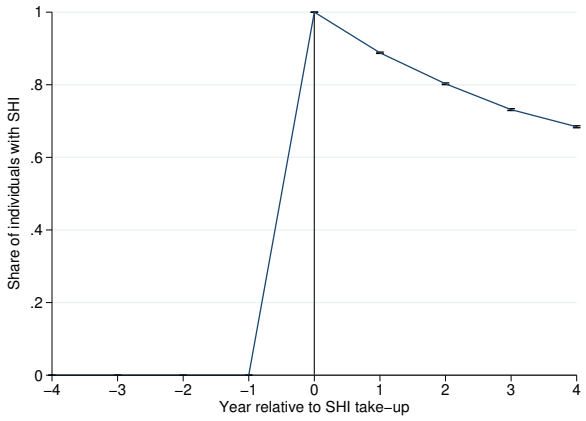


Note: This figure reports estimated effects of SHI on healthcare utilization and costs, comparing national estimates to those based on the Stockholm sample. Panel (a) shows impacts on total healthcare costs and cost components, analogously to Figure 3a. Panel (b) reports effects on the number of healthcare visits and on number of prescription drugs dispensed at the pharmacy. Prescription drug use is measured as the total number of dispensed prescription fills. We also consider an alternative measure capturing the breadth of drug utilization, defined as the number of unique medications dispensed to an individual, identified by distinct five-character ATC codes. This aggregation corresponds to the chemical substance level and captures changes in the range of pharmacologically distinct treatments received, rather than variation in dosage or refill frequency. All 95% confidence intervals are based on standard errors clustered at the individual level.

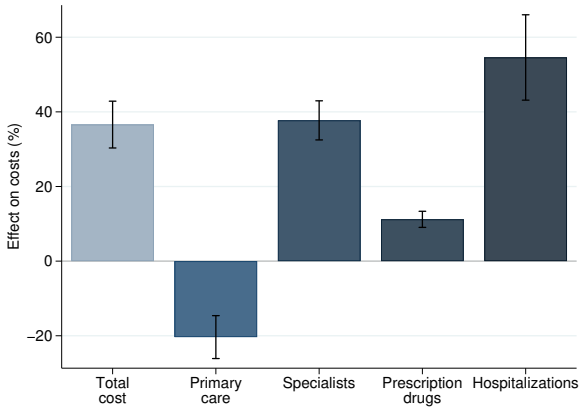
Figure E.2: **Scaling by SHI take-up**

Full sample

(a) First stage

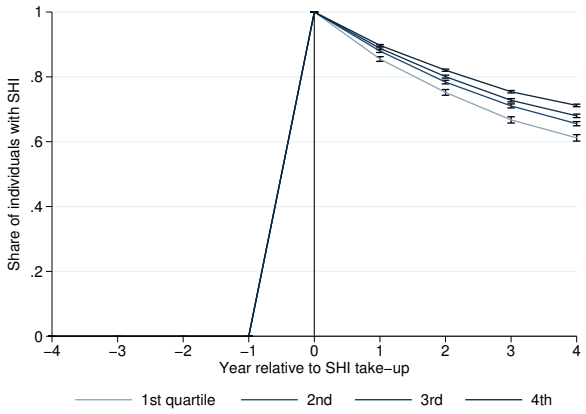


(b) Effect scaled by SHI take-up

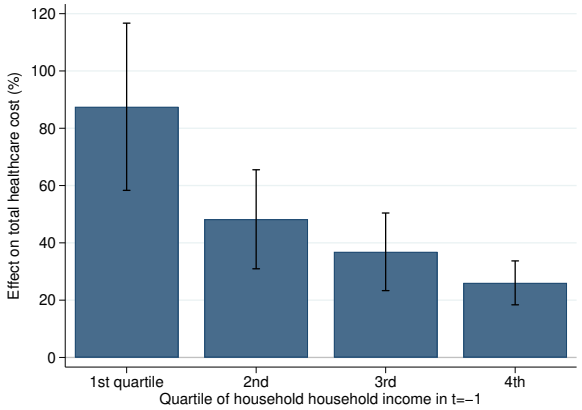


By income

(c) First stage

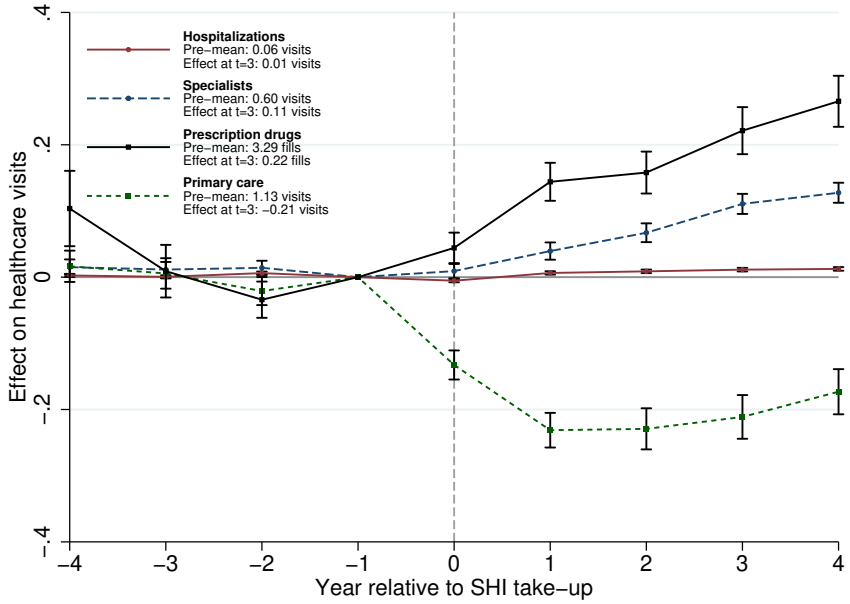


(d) Effect scaled by SHI take-up



Note: This figure reports the evolution of SHI enrollment following employer SHI take-up and presents the $t = 3$ cost estimates scaled by the pre-mean ($t = -1$) from Figures 3a and 4a, scaled by the corresponding SHI enrollment rates at $t = 3$. **Panel (a)** shows the dynamic effect of first employer SHI take-up on subsequent SHI coverage (employer provided and other). **Panel (b)** reports the effect of SHI enrollment on healthcare costs, scaled by SHI take-up rates in $t = 3$. **Panel (c)** splits the dynamic SHI coverage by income quartiles. **Panel (d)** reports the effect of SHI enrollment on total healthcare costs, scaled by income–group-specific SHI take-up rates. 95% confidence intervals in Panel (b) and (d) are approximated using the delta method.

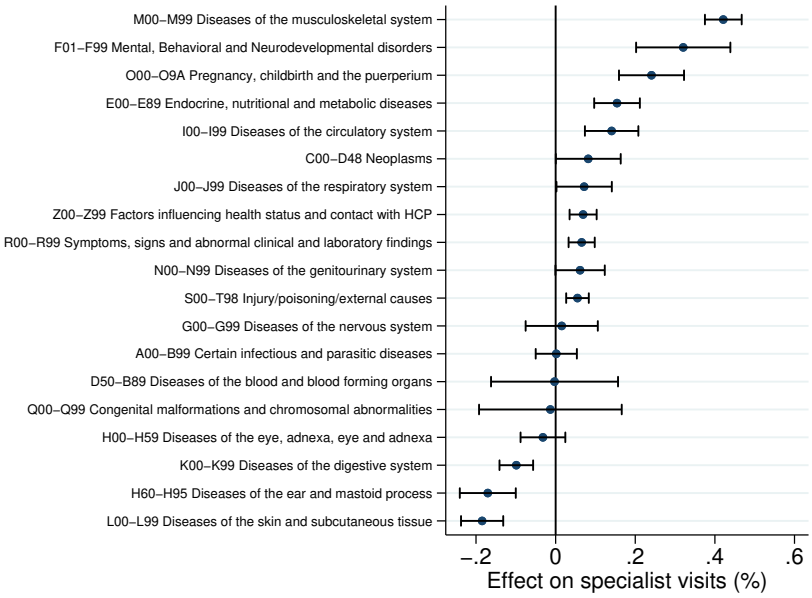
Figure E.3: **Dynamic effects: utilization**



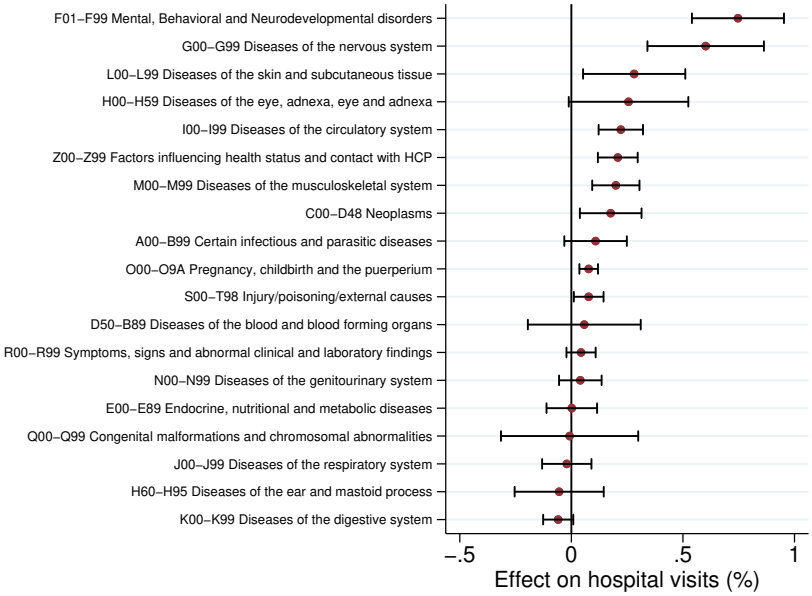
Note: This figure reports dynamic effect of SHI on the number of healthcare visits (hospitalizations, specialists and primary care) and on prescription drug use, measured as the total number of dispensed prescription fills. Primary care visits are estimated only for Stockholm. Effects are estimated using Equation (1). 95% confidence intervals are constructed using standard errors clustered at the individual level.

Figure E.4: **Effects by type of care and ICD chapter**

(a) Specialist visits



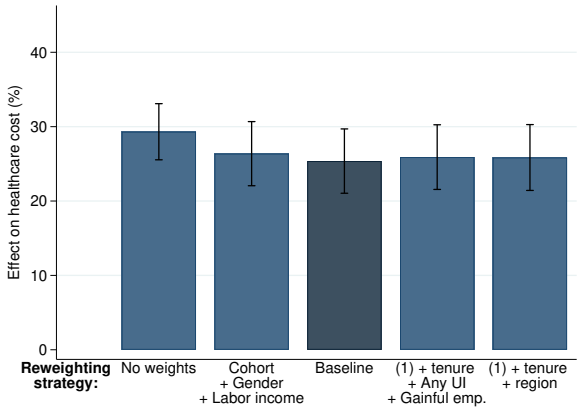
(b) Hospital visits



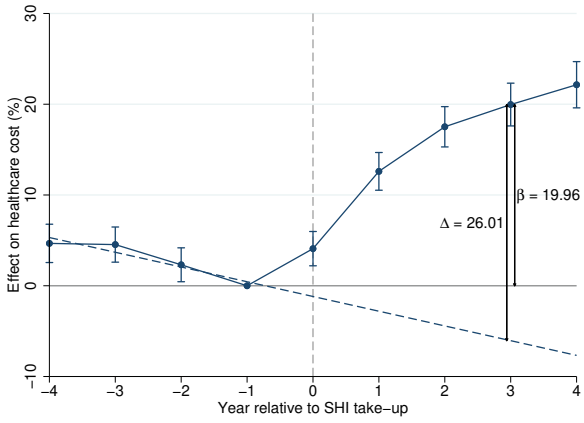
Note: This figure reports the point estimates used to construct Figure 3b. **Panel (a)** shows specialist visits and **Panel (b)** hospital visits, both expressed relative to the pre–SHI take-up mean. Estimates are obtained from a pre–post specification of equation (1): $\hat{y}_{it} = \alpha + \beta\, 1\{t - T_i > 0\} + \mu + \varepsilon_{it}$, where $\hat{y}_{it}$ denotes the outcome for individual i in year t after subtracting the mean of the comparison group in year t. T_i is the year of SHI take-up, and μ denotes SHI-cohort fixed effects. The coefficient β captures the average post–SHI effect. The 95% confidence intervals are based on standard errors clustered at the individual level.

Figure E.5: **Robustness**

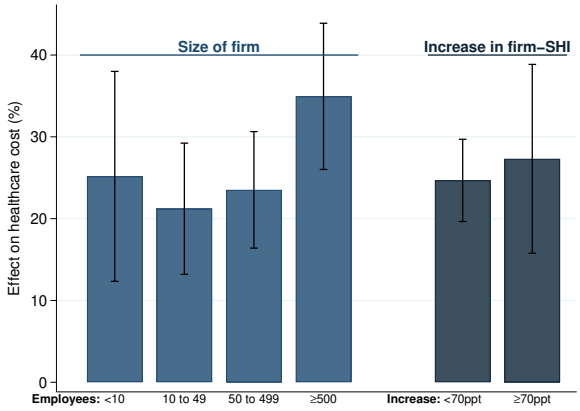
(a) Different the re-weighting strategy



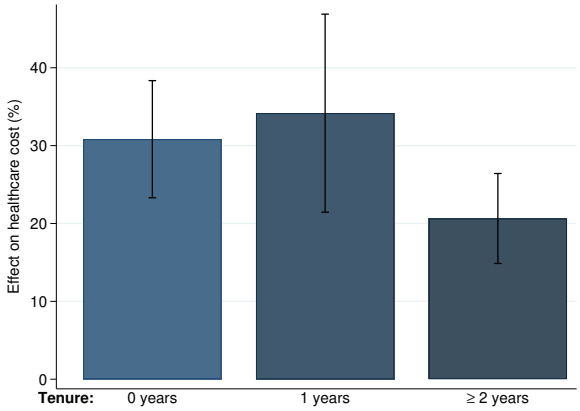
(b) Alternative design: Callaway & Saint'Anna



(c) Share getting SHI within firm and firm size



(d) Tenure

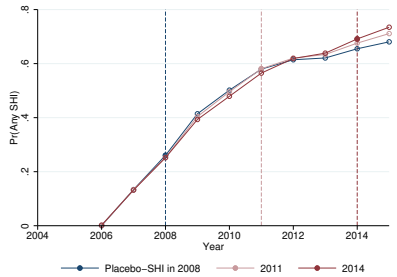


Note: This figure presents robustness checks for the estimated effect of employer-provided SHI on healthcare costs (excluding primary care costs). The bars consequently show the event-time 3 estimates scaled by the pre-treatment mean ($t = -1$). **Panel (a)** reports how the estimated effect on healthcare costs varies under different re-weighting strategies, ranging from no weights to rich matching schemes based on demographic characteristics and labor-market histories, using our baseline design. The third bar shows our baseline weighting strategy. We reweigh the control cohorts of each treatment group separately. E.g. enrollment cohorts 2012-2015 are reweighted to match characteristics of the 2007 cohort. The share of treated units with empty cells vary from 0.1% to 6% across the four different strategies. The composition of the control group changes between each weighting strategy due many cell without treated. **Panel (b)** estimates the effect of SHI on healthcare costs using the doubly robust estimator of Callaway and Sant'Anna (2021), with all not-yet-treated individuals serving as the control group. This approach allows us to relax the requirement that individuals must remain alive and employed in event time $t = 5$. We include controls for birth cohort, gender, and education measured at $t = -1$ (avoiding time varying controls). Healthcare costs are transformed using the inverse hyperbolic sine function prior to estimation, allowing for a percentage-change interpretation of the coefficients. Standard clustered at the individual level are used to estimate 95% confidence intervals. **Panel (c)** reports estimates by firm size (measured in event year $t = -1$) and by the share of employees within the firm who receive SHI in year $t = 0$ (conditional on having more than 10 employees in event-time $t = -1$) using our baseline design. We compute the change in share of workers who are covered in year $t = 0$ and $t = -1$ and divide the sample into those cases where that change is larger or equal to 70 percentage points. **Panel (d)** shows heterogeneity by worker tenure at the time of SHI take-up. 95% confidence intervals are based on standard errors clustered at the individual level.

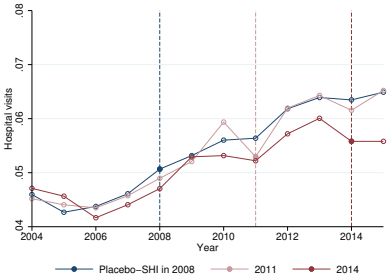
Figure E.6: **Healthcare: placebo test**

Raw means

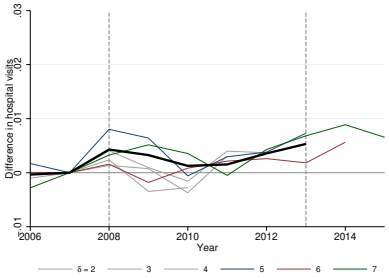
(a) SHI placebo enrollment



(b) Hospitalizations

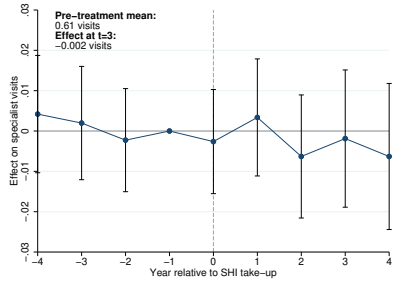


(c) Different δ's

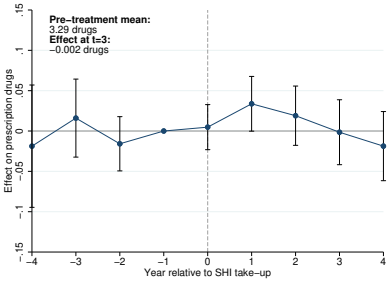


Estimates using Eq (1)

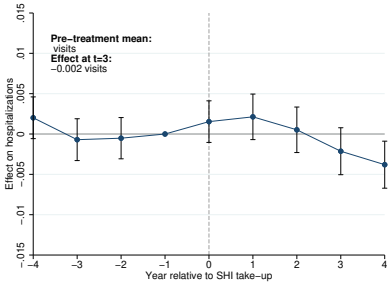
(d) Specialist visits



(e) Prescription drugs

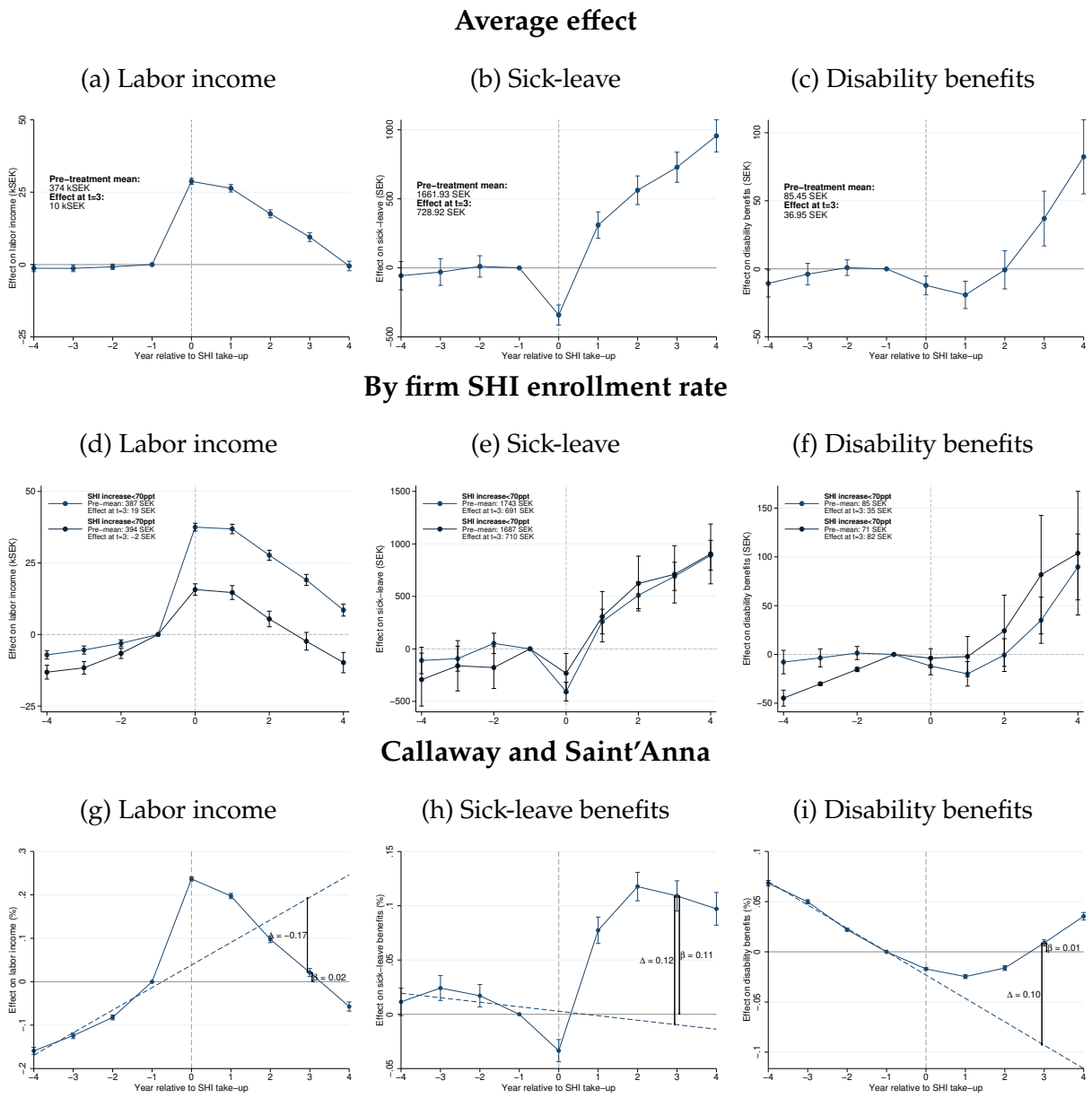


(f) Hospitalizations



Note: This figure report a placebo test in which "treatment" timing is randomly reassigned among individuals who receive employer-provided SHI during our study period. Specifically, we construct a placebo SHI enrollment year by permuting the observed employer-SHI start year within strata defined by gender and birth cohort. This procedure preserves the cohort composition of treated individuals while severing any systematic relationship between enrollment timing and outcomes. The baseline analysis sample is identical to that used in the main specifications. **Panels (a)–(c)** replicate Appendix Figure D.1, focusing on the placebo enrollment year 2008. To mirror the main design, we restrict the sample to individuals employed in 2007, 2008, and in the year of placebo enrollment, ensuring that both treated and comparison cohorts satisfy the same employment requirement at enrollment as in the main analysis. Panel (a) confirms that the randomization is valid: SHI enrollment exhibits neither differential trends nor discrete jumps at the placebo enrollment year. Panel (b) shows parallel raw trends in hospitalizations before and after the placebo enrollment year, and Panel (c) demonstrates similar difference patterns across alternative δ comparisons. **Panels (d)–(f)** apply the main identification strategy to the placebo setting, estimating event-study effects for total healthcare costs (excluding primary care), specialist visits, and hospitalizations using Eq (1). Across outcomes, we find only small post-placebo effects, supporting the validity of the research design and indicating that the main results are not driven by spurious timing patterns.

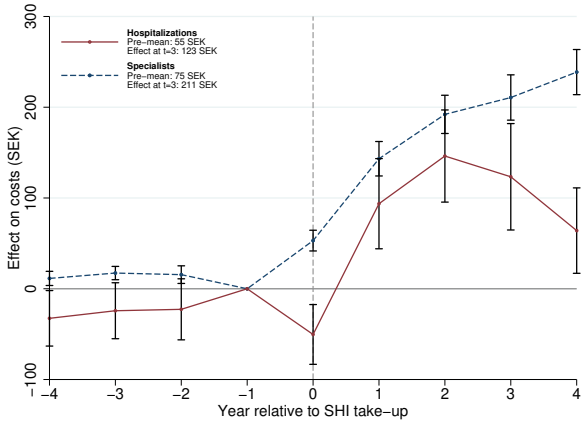
Figure E.7: **Additional outcomes: Income, sick-leave and disability benefits**



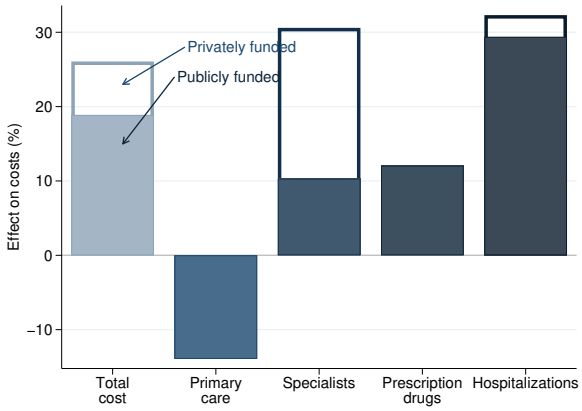
Notes: The figure reports event-study estimates of the effect of SHI take-up on three labor market outcomes: labor income, measured as total annual pre-tax earnings (in thousands of SEK), and sick leave and disability benefits, measured as total annual payments (in SEK) from the respective programs. **Panels (a)–(c)** present baseline estimates using our main specification (1). Ninety-five percent confidence intervals are based on standard errors clustered at the individual level. **Panels (d)–(f)** split the sample by the share of coworkers within the same firm who acquire SHI in the same year as the index individual, as in Panel (b) of Appendix Figure E.5. This measure captures the extent of within-firm expansion of coverage at the time the individual enrolls in SHI. **Panels (g)–(i)** estimate the effect of SHI on the same outcomes using the doubly robust estimator of Callaway and Sant'Anna (2021), with all not-yet-treated individuals serving as the control group (same as in E.5, panel (b)). This approach relaxes the requirement that individuals must remain alive and employed at event time $t = 5$. We include controls for birth cohort, gender, and education measured at $t = -1$, avoiding time-varying controls. Outcomes are transformed using the inverse hyperbolic sine function prior to estimation, allowing for a percentage-change interpretation of the coefficients. Ninety-five percent confidence intervals are based on standard errors clustered at the individual level.

Figure E.8: **Publicly and privately funded care in Stockholm**

(a) Dynamic effects: privately funded care



(b) Cost decomposition

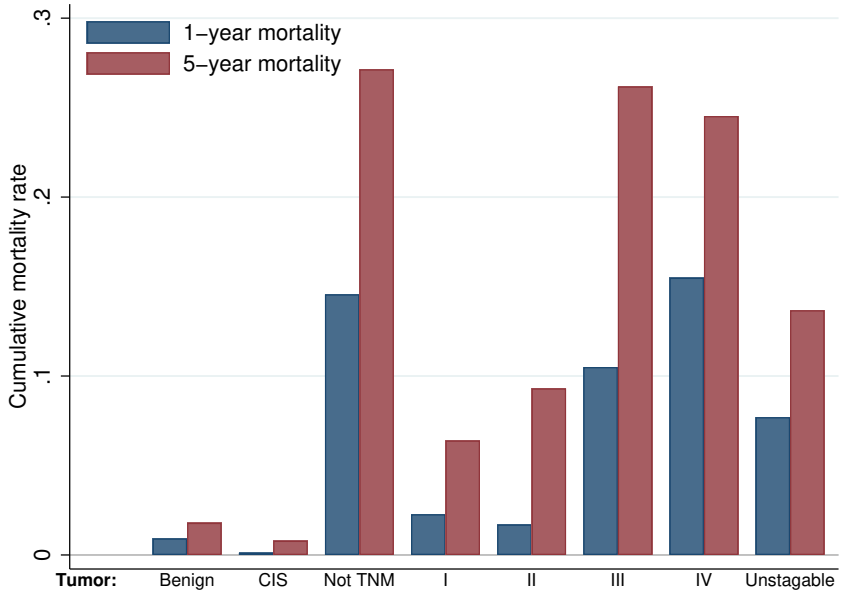


Note: **Panel (a)** reports the dynamic effects of SHI on privately funded specialist and hospital costs using the Stockholm sample. **Panel (b)** shows the decomposition of publicly and privately funded care using the Stockholm sample. We take the event-time $t = 3$ estimate and divide by the pre-treatment ($t = -1$) mean. The shares of publicly and privately funded care are used to generate Figure 6 for the national decomposition. We estimate the effects using Equation (1) and 95% confidence intervals are constructed using standard errors clustered at the individual level.

F Effects of SHI on mortality, cancer and cancer survival

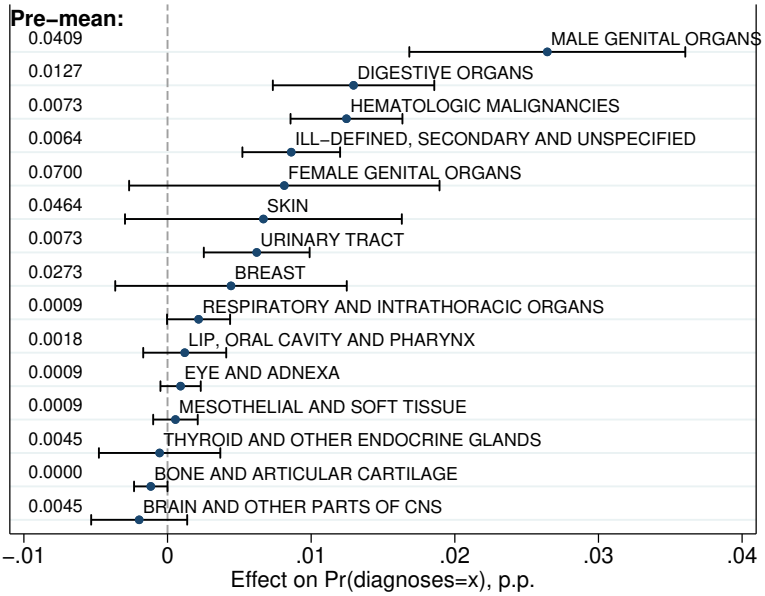
Figure F.1: **Mortality by stage of cancer and SHI status**

(a) Mortality by stage of cancer



Note: Panel (a) reports the cumulative one- and five-year cancer mortality rates following cancer diagnosis. The sample comprises individuals aged 25–63 who were employed at a firm in the year prior to their cancer diagnosis and were diagnosed with cancer between 2007 and 2015.

Figure F.2: **Effect of SHI on the probability of a new cancer diagnosis, by site**

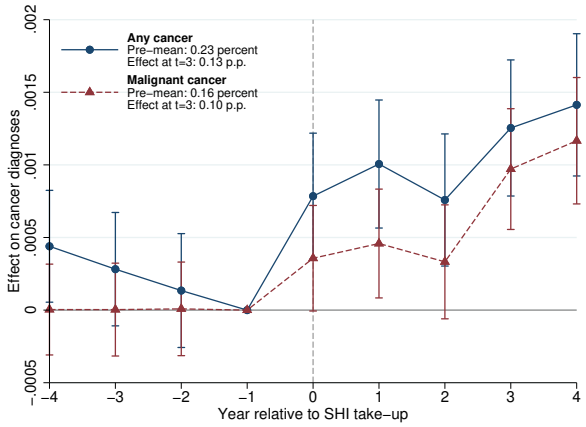


Note: This figure reports estimates of the effect of SHI on the probability of detecting a new cancer diagnosis by site, based on equation (2). Effects are expressed in percentage points. The pre-period mean, expressed as percent, for each site is reported to the left of the corresponding estimate.

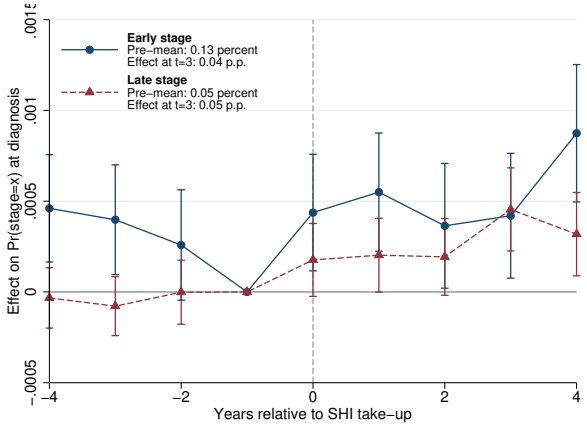
Figure F.3: **SHI and cancer**

Baseline design:

(a) Any cancer vs. malignant

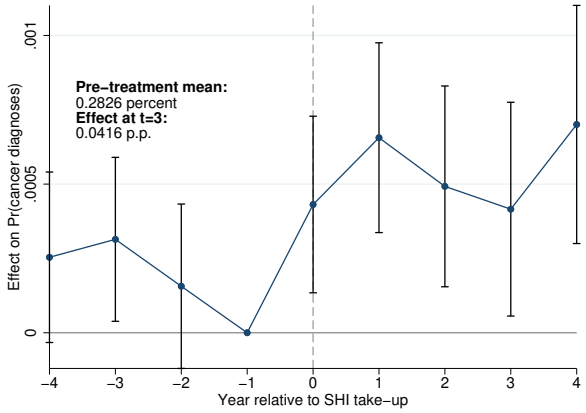


(b) Early vs. late stage

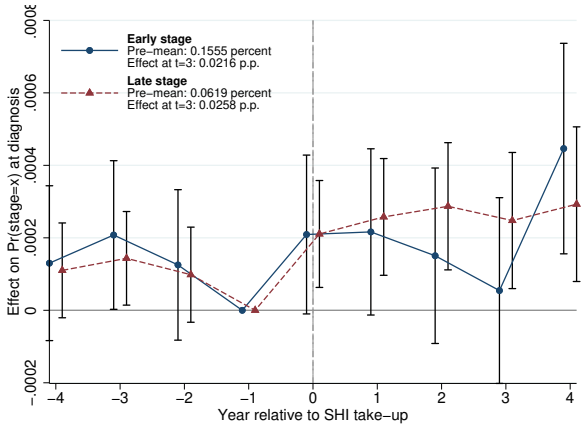


Callaway and Saint'Anna:

(c) Pr(cancer diagnosis)



(d) Early vs. late stage



Note: **Panels (a) and (b)** report event-study estimates of the effect of SHI take-up on cancer outcomes using our baseline design (see specification (1)). Panel (a) shows effects on diagnoses of any cancer and malignant cancer. Panel (b) shows effects on the probability that a cancer diagnosis is early- or late-stage. **Panels (c) and (d)** report corresponding estimates using the Callaway and Sant'Anna estimator: panel (c) shows the effect on the probability of any cancer diagnosis, and panel (d) shows effects on early- and late-stage diagnoses. Any cancer includes ICD-10 codes C00–D48. Malignant cancers are defined as ICD-10 codes C00–C99. Early-stage cancers include carcinoma in situ (ICD-10 D00–D09) and stage I–II solid tumors, while late-stage cancers include stage III–IV solid tumors. All estimates are shown with 95% confidence intervals, with standard errors clustered at the individual level.

Table F.1: Stage of cancer at diagnoses

Panel (a): OLS estimate						
	(1) CIS	(2) Stage I	(3) II	(4) III	(5) IV	(6) Linear
SHI	0.0071	0.0060	0.0022	-0.0046	-0.0102	-0.0526
	(0.0032)	(0.0038)	(0.0025)	(0.0026)	(0.0026)	(0.0116)
R-Squared	0.534	0.175	0.148	0.174	0.562	0.564
Observations	142,468	142,468	142,468	142,468	142,468	116,250
Panel (b): IV estimate using the leave-one-out firm instrument						
	(1) CIS	(2) Stage I	(3) II	(4) III	(5) IV	(6) Linear
SHI	0.0055	0.0083	0.0010	-0.0011	-0.0076	-0.0465
	(0.0062)	(0.0075)	(0.0048)	(0.0050)	(0.0051)	(0.0226)
First stage	.99	.99	.99	.99	.99	.99
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
FS: F-statistic	24,373	24,373	24,373	24,373	24,373	19,406
Observations	142,468	142,468	142,468	142,468	142,468	116,250

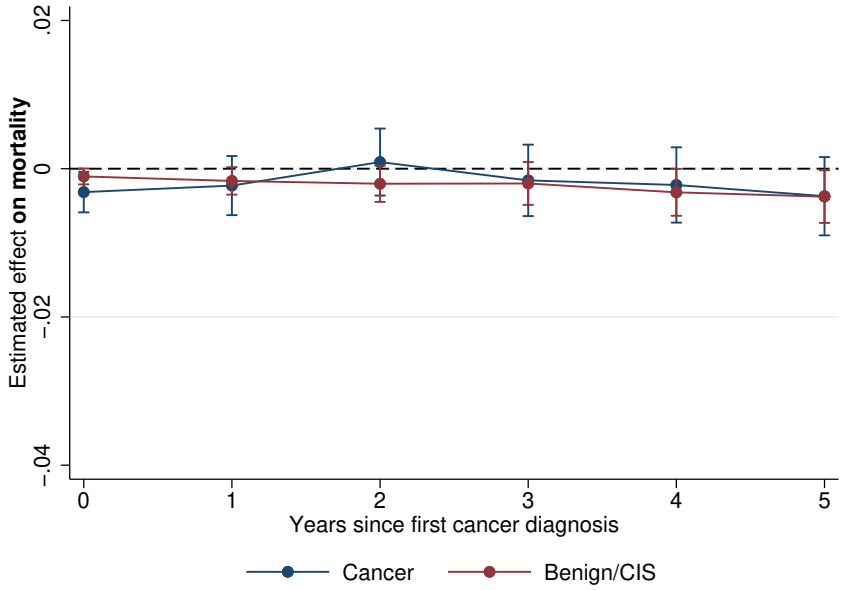
Note: Columns (1) to (5) in **Panel (a)** show our baseline OLS estimates of the association between SHI and cancer stage at diagnoses, the same as shown in Figure 5c. Cancer stages are defined according to the AJCC 8th Edition TNM (Tumor, Node, Metastasis) system for solid tumors (stages I–IV), following (American Joint Committee on Cancer, 2017). Hematologic and central nervous system tumors that are not staged using TNM, as well as unstageable solid tumors (where T, N, or M are missing or not measured), account for 18% of malignant tumors in our sample. Column (6) replaces the categorical indicators for cancer stage with a linearized measure of stage severity, ranging from 1 (CIS) to 5 (Stage IV). **Panel (b)** reestimates the effect of SHI on cancer stage at diagnosis using a leave-one-out measure of co-worker employer SHI coverage as an instrument for individual SHI status. For each individual i employed at firm f, the instrument is defined as $Z_i = \frac{1}{N_f - 1} \sum_{j \in f,\, j \neq i} SHI_j$, which captures firm-level variation in SHI coverage. Firm attachment for individual i and co-workers' employer-provided SHI coverage are both measured in the year prior to cancer diagnosis. Identification relies on two assumptions standard in this setting. First, the *exclusion restriction* requires that conditional on controls, co-workers' SHI coverage affects individual i's cancer stage at diagnosis only through its effect on i's own SHI enrollment, and not through other firm-level channels. Second, *monotonicity* requires that higher co-worker SHI coverage weakly increases the probability that individual i is covered by SHI. The first stage relates individual SHI coverage (firm-based, individual, or other group SHI) to this instrument, $SHI_i = \pi_0 + \pi_1 Z_i + X_i\delta + \varepsilon_i$, and structural parameters are recovered via two-stage least squares (2SLS). The parameter of interest, β_1, captures the local average treatment effect of SHI on stage at diagnosis for compliers. Both OLS and IV specifications include baseline controls for calendar year, age, gender, region of residence (21 regions), industry (20 categories), household disposable income rank (100 percentiles), and education (four levels). Column (2) additionally controls for 22 chronic condition indicators, defined as having filled prescriptions in $t = -1$ and $t = -2$, following Danesh et al. (2024). The sample in columns (1) to (4) include individuals aged 25–63 who are diagnosed with their first malignant tumor between 2007 and 2015 that are employed at a firm with 5 or more employees in the year before diagnosis. Robust standard errors are reported in parentheses.

Table F.2: Three-year mortality

Outcome: Three-year mortality					
Panel (a): OLS estimate					
	Malignant cancers				Benign/CIS
	(1)	(2)	(3)	(4)	(5)
SHI	-0.0201	-0.0187	-0.0057	-0.0016	-0.0021
	(0.0031)	(0.0031)	(0.0026)	(0.0025)	(0.0015)
R-Squared	0.043	0.046	0.347	0.430	0.015
Observations	142,468	142,468	142,468	142,468	45,241
Controls:					
Chronic conditions	No	Yes	Yes	Yes	Yes
Cancer site	No	No	Yes	Yes	No
Stage at diagnosis	No	No	No	Yes	No
Panel (b): IV estimate using the leave-one-out firm instrument					
	(1)	(2)	(3)	(4)	(5)
SHI	-0.0209	-0.0195	-0.0153	-0.0121	0.0010
	(0.0058)	(0.0058)	(0.0048)	(0.0047)	(0.0029)
First stage	1	.99	.99	.99	.98
	(.01)	(.01)	(.01)	(.01)	(.01)
FS: F-statistic	24,413	24,387	24,373	24,366	7,486
Observations	142,468	142,468	142,468	142,468	45,241
Controls:					
Chronic conditions	No	Yes	Yes	Yes	Yes
Cancer site	No	No	Yes	Yes	No
Stage at diagnosis	No	No	No	Yes	No

Note: **Panel (a)** reports our baseline OLS estimates of the association between SHI and three-year all-cause mortality, corresponding to the results shown in Figure 5d. Figure F.4 presents analogous estimates using the specifications in columns (4) and (5), but varying the mortality horizon from one to five years. In **Panel (b)** we reestimate the effect of supplementary health insurance on three-year mortality using the leave-one-out share of co-worker employer SHI coverage in $t = -1$ as an instrument. See Appendix table F.1 for details. Both the OLS and IV include baseline controls: year, age, gender, region of residence (21 regions), household disposable income rank (100 percentiles), and education (four levels). In column (2), we add 22 chronic condition dummy variables to capture underlying health status that may affect mortality. These measure chronic conditions as filling prescriptions for in $t = -1$ and $t = -2$ as in Danesh et al. (2024). In column (3) we add indicators for cancer sites measured using ICD-O-3 codes, and in column (4) we add controls for stage of cancer at diagnosis. The sample in columns (1) to (4) include individuals aged 25–63 who are diagnosed with their first malignant tumor between 2007 and 2015 that are employed at a firm with 5 or more employees in the year before diagnosis. Column (5) use the same inclusion restrictions but for individuals diagnosed with a CIS or begin tumors. Robust standard errors are reported in parentheses.

Figure F.4: **Effect of SHI on mortality following cancer**

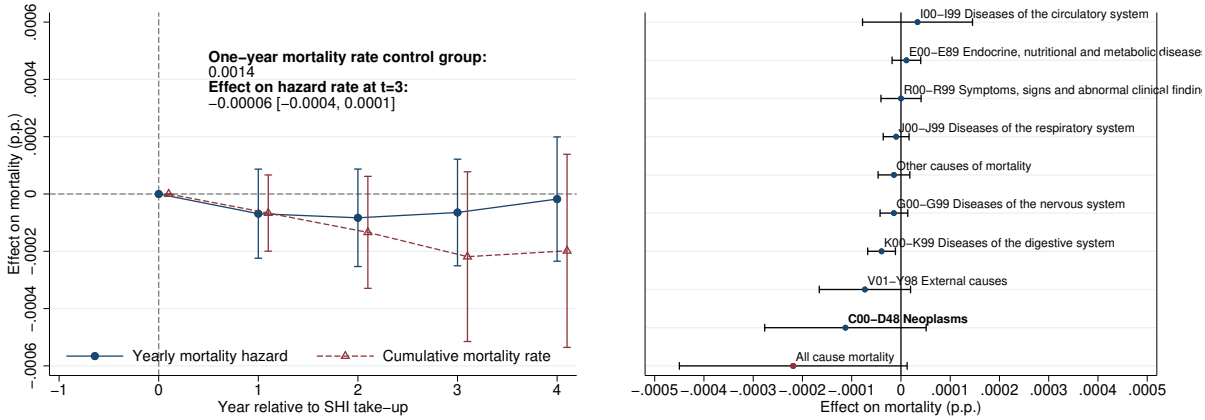


Note: This figure shows estimated cumulative differences in mortality rates by years since the first cancer diagnosis between individuals with SHI and those without SHI. Estimates are reported separately for malignant cancers and for benign tumors or carcinoma in situ (CIS). The estimates use the same specification as bars 4 and 5 in Figure 5d, with 95% confidence intervals constructed using standard errors clustered at the individual level.

Figure F.5: **SHI and Mortality**

(a) Mortality hazard rates

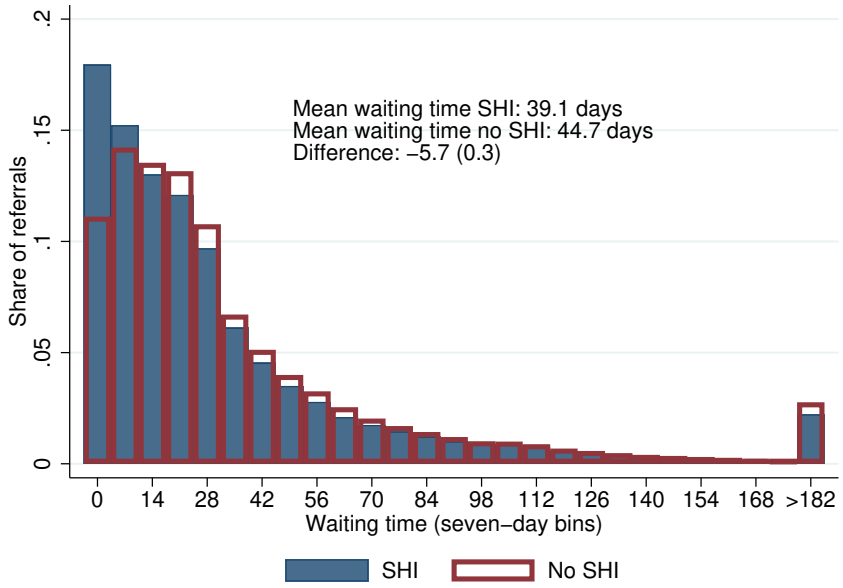
(b) Three year cumulative mortality



Note: This figure estimate the effect of SHI on mortality outcomes. **Panel (a)** reports event-study estimates of the effect of SHI on one-year mortality hazard rates, while **Panel (b)** reports the corresponding effects on three-year cumulative mortality. All estimates are obtained inline with Callaway and Sant'Anna (2021). In Panel (a), the sample consists of individuals who are untreated at baseline and are observed continuously over the full event window from $t = 0$, which denotes the year of SHI take-up in the treatment group. The outcome is an indicator equal to one if the individual dies within one year of the observation period. Event time coefficients are reported relative to $t = 0$. The plotted series shows the dynamic treatment effects up to four years post-enrollment, along with 95% confidence intervals. In Panel (b), the sample is restricted to individuals with complete survival histories over a three-year horizon following treatment eligibility. The outcome is an indicator equal to one if the individual dies within three years. Estimates are presented separately by cause-of-death categories (ICD-10 groupings) as well as for all-cause mortality. The control group in both panels consists of all not-yet-treated individuals. All specifications include controls for gender, age, and a flexible set of socioeconomic covariates measured at baseline, including disposable household income percentiles, employment status, and educational attainment (four categories). To ensure comparability across event time, all covariates are fixed at their values in the pre-treatment period $t = -1$. Standard errors are clustered at the individual level, and all confidence intervals correspond to the 95% level. The reported effects are expressed in percentage-point difference in mortality risk. The baseline (control group) one-year mortality rate is reported in Panel (a) for reference.

G Effect of SHI on waiting times

Figure G.1: **Waiting time distribution**

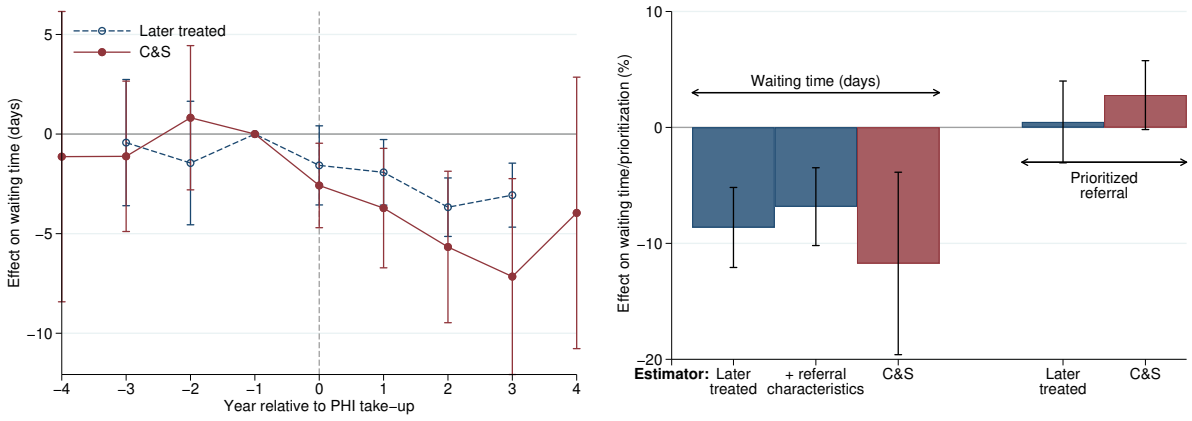


Note: This figure plots the distribution of observed waiting times by SHI status using the CVR-data. The sample includes 2,268,429 individual referrals attached to those in ages 25-65, issued between 2008 and 2015 for publicly funded care in region Stockholm. Referrals are grouped into seven-day waiting-time intervals, with the first bin covering 0 to 6 days (0.7% of referrals have zero days waiting time). The height of each bar shows the share of referrals that falls within each bin, computed separately for those with SHI and those without. We top-code waiting times above 182 days in the last bar (2.6% of all referrals). Filled bars correspond to individuals with SHI and outlined bars to individuals without SHI. Reported means are the average waiting time for each group, and the difference is the β-coefficient (s.e.) from running: $y_{i,r} = \alpha + \beta SHI_i + e_{i,r}$, where SHI=1 if the individual have SHI in the year the referral is issued.

Figure G.2: **Later treated versus Callaway & Sant'Anna**

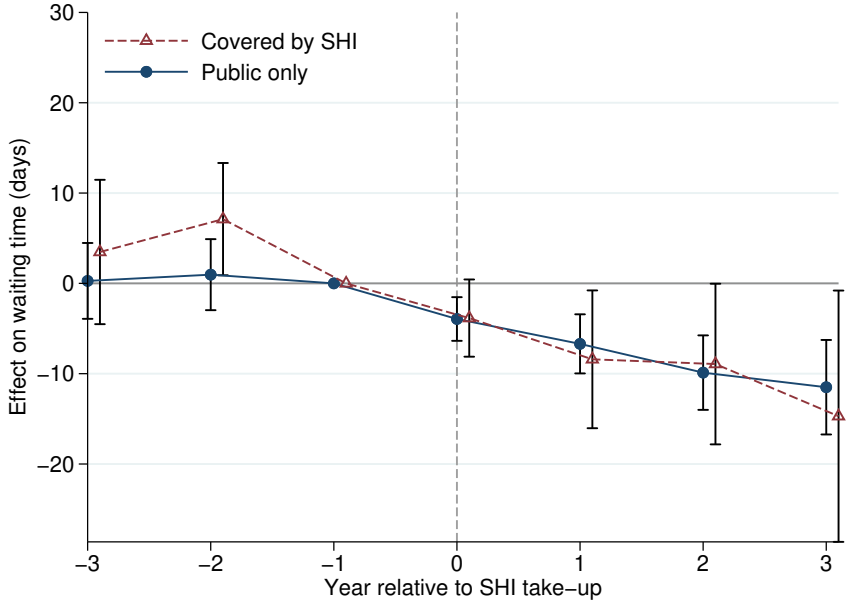
(a) Dynamic effects

(b) Waiting time and Pr(prioritization)



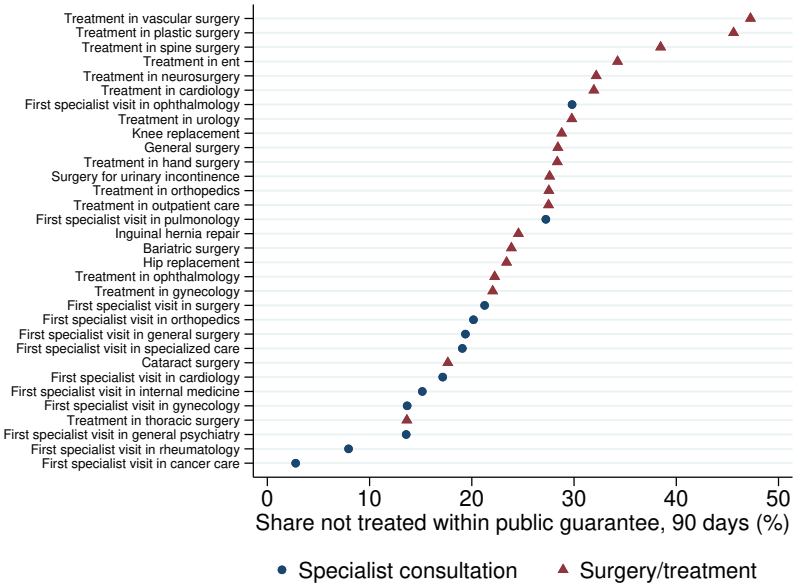
Note: The maroon series in **Panel (a)** plot the dynamic estimates corresponding to Figure 7. The navy series report estimates from a stacked cohort-by-time difference-in-differences event-study design amid to mimic our baseline design, while taking into account the data limitations in the referral data used to measure wait times. For each treatment cohort g, later-treated units serve as controls while untreated. Given the 2008–2015 referral window, we estimate up to three leads and lags, restricting to cohorts $g \in \{2009, \ldots, 2013\}$. Early cohorts contribute fewer pre-treatment observations, and later cohorts fewer post-treatment observations. The estimated specification is $Y_{r,g,t} = \alpha + \lambda_t + \mu_T + \sum_{k \neq -1} \beta_k \, \mathbf{1}\{t - T_g = k\} \cdot \mathbf{1}\{T_r = g\} + X_r'\gamma + \varepsilon_{r,g,t}$, where $Y_{g,t}$ is the the wait time observed for in a referral in year t from cohort g, λ_t are year fixed effects, and X_r includes baseline individual and referral characteristics. The omitted period is $k = -1$, so β_k captures the effect at relative time k relative to the year before treatment. **Panel (b)** reports $t = 3$ estimates scaled by the pre-treatment mean. The first two bars use the stacked difference-in-differences estimator above, without and with referral controls, respectively. The third bar reports the $t = 3$ estimate from Callaway and Sant'Anna (2021), including referral characteristics (i.e., the effect in Figure 7, scaled by the pre-treatment mean). Bars four and five report effects on an indicator for a prioritized referral under the two methods, including referral controls. All 95% confidence intervals are based on robust standard errors.

Figure G.3: **Public only versus SHI covered care**



Notes: The figure reports the dynamic effect of SHI on waiting times, separately for referrals associated with conditions that are generally excluded from SHI coverage under the applicable terms and conditions (public-only care) and for referrals associated with conditions covered by SHI. Excluded categories are defined using ICD-10 diagnosis codes recorded as either the primary or secondary diagnosis. Conditions classified as excluded include: mental disorders due to dementia (F00–F09); mental and behavioural disorders due to psychoactive substance use (F10–F19); schizophrenia, schizotypal, and delusional disorders (F20–F29); eating disorders (F50); and other mental and behavioural disorders, including mood, anxiety, personality, and developmental disorders (F51–F99); obstetrics and maternity (O00–O99); congenital and chromosomal conditions (Q00–Q99); dental conditions (K00–K14); fertility, assisted reproduction, and family planning (Z30–Z39, N46, N97); cosmetic and reconstructive-related encounters (Z41–Z42); donor or recipient administration and transplant status (Z49, Z52, Z94); communicable disease exposure or status and selected common acute infections (Z20–Z29, J00–J06, H10, H66); diabetes (E10–E14); malnutrition, overweight, and obesity (E40–E46, E65–E68); chronic renal failure and dialysis-related conditions (N18–N19); sleep disorders and snoring-related conditions (G47, R06); chronic cardiac conditions (I20–I25, I50); chronic lower respiratory conditions (J40–J47); cancer and neoplasms (C00–D48); and social or behavioral factors influencing health (Z55–Z65). An observation is classified as excluded if any diagnosis code falls within these ranges. We construct the list of excluded conditions by downloading the current general terms and conditions from insurers' webpages and mapping the listed exclusions to ICD-10 codes using a large language model. This procedure is likely to understate the set of excluded (public-only) care, as some exclusions—such as injuries related to sporting activities—are not fully captured. We match individual referrals to the Stockholm billing records using date information to obtain the ICD-10 from the visits. When multiple visits are matched to the same referral, we give priority to visits closest in time to the referral date. Effects are estimated following Callaway and Sant'Anna (2021), allowing never treated be included in the control group to increase statistical power. 95% confidence intervals are base on robust standard errors.

Figure G.4: **National wait time guarantee compliance**



Note: This figure reports the official statistics on the percent of patients not treated within the statutory 90-day guarantee, separately for first specialist consultations and surgical/treatment procedures, by type of care. Values are expressed in percent. The figure is based on data from Sveriges Kommuner och Regioner (2023) for the years 2011 to 2022.

H Distributional analysis

Appendix Table H.1 maps the theoretical welfare framework in equations (4)–(6) to its empirical implementation. By linking each model object—changes in utilization, waiting times, fiscal costs, and congestion spillovers—to observed estimates or calibrated parameters, the table shows how per-enrollee consumer surplus, $\Delta u_{g,S}$, fiscal externalities, X_g^q, and congestion externalities, X_g^w, are constructed. All components are evaluated at event time $t = 3$. This structure highlights that distributional differences in ΔW_g can arise from three sources: heterogeneity in per-enrollee surplus, differences in enrollment rates S_g, and the incidence of congestion costs in a capacity-constrained public system.

Table H.1: Theoretical Framework → Empirical Objects

Theoretical Object	Symbol	Empirical Counterpart	Value Used	Status
Private OOP covered	Δz_S	Private OOP	130 SEK	Observed
Total spending increase	Δq_S	Change in health care use	1058 SEK	Estimated
Public spending increase	Δq^0	Fiscal externality	716 SEK	Estimated
Public waiting-time change	Δw_S^0	Specialist wait reduction	-7.4 days	Estimated
Private/public wait gap	$w^0 - w^1$	48 → 7 days	41 days	Implied
Value of one waiting day	λ	$\$2.5/186$	≈ 0.014	Russo (2023)
Congestion externality	Δu_{noS}	Waiting loss to uninsured	470 SEK	Model-implied
Marginal value of healthcare	$v'(q)$		1	Normalized

Note: This table maps the theoretical welfare framework (equations (4)–(6)) to its empirical implementation. We normalize $v'(q) = 1$, so marginal healthcare spending is valued at its resource cost, and monetize waiting-time reductions using λ, the willingness to pay for a one-day reduction in waiting time. Consumer surplus for SHI enrollees (equation (4)) is given by $\Delta u_S \approx v'(q)\Delta q_S - \Delta z_S - \lambda q^0 \Delta w_S^0 + \lambda(w^0 - w^1)\Delta q_S^1$. Empirically, $v'(q)\Delta q_S$ is measured as the estimated increase in total healthcare expenditures (public plus private) at event time $t = 3$, obtained by summing the component estimates in Figure 2b; Δz_S captures the reduction in out-of-pocket payments due to insurance coverage of privately financed care and corresponds to the consumption value of SHI; $\lambda q^0 \Delta w_S^0$ uses the estimated public waiting-time reduction from the event-study specification, scaled by baseline public utilization q^0 and monetized using λ; and $\lambda(w^0 - w^1)\Delta q_S^1$ reflects the benefit from shifting marginal care to the faster private channel, where $(w^0 - w^1)$ is calibrated using 48 days in the public system versus the advertised 7 days under SHI, and Δq_S^1 is the estimated increase in privately financed utilization. The willingness-to-pay parameter is set to \$2.5 per day (Russo, 2023); dividing by the average cost of a U.S. GP visit (\$186) yields $\lambda \approx 0.014$, which converts waiting-time reductions into monetary equivalents proportional to healthcare expenditure. The fiscal externality (equation (5)) is measured as the estimated increase in publicly funded healthcare expenditures induced by SHI enrollment (716 SEK per enrollee per year in the baseline specification). The congestion externality on non-enrollees (equation (6)) is summarized by Δu_{noS}, the monetized waiting-time loss to uninsured individuals (470 SEK per enrollee per year in the baseline specification). Net welfare for income group g is computed as $\Delta W_g = CS_g - (X_g^q + X_g^w)$. All monetary values are expressed in SEK per enrollee per year and evaluated at event time $t = 3$; in the baseline specification, external costs offset almost two thirds of private gains.

Table H.2 leverages this decomposition to isolate which margins drive the unequal net benefits of SHI and to assess the sensitivity of the distributional pattern to alternative valuations and counterfactual coverage regimes. For each income group g, net value is given by $\Delta W_g = CS_g - (X_g^q + X_g^w)$, where $CS_g = S_g \cdot \Delta u_{g,S}$ aggregates per-enrollee consumer surplus using the group-specific enrollment rate S_g. Here, $\Delta u_{g,S}$ denotes the causal effect of SHI on utility for the marginal enrollee and should be interpreted as a

local average treatment effect (LATE) for compliers. X_g^q denotes the fiscal externality, and X_g^w the congestion externality allocated across income groups in proportion to healthcare utilization among uninsured individuals.

The exercises in Table H.2 isolate which elements of this decomposition drive the unequal net benefits observed across the income distribution. Row (1) first provides our baseline estimates for Q1 and Q4, corresponding to Figure 9d.

Row (2) sets $X_g^w = 0$, holding CS_g and X_g^q fixed. Under this counterfactual, net value simplifies to $\Delta W_g = CS_g - X_g^q$ and becomes positive for both quartiles. This exercise isolates the role of congestion: fiscal externalities alone do not overturn private gains, whereas congestion spillovers are sufficient to generate negative net value at the bottom of the distribution. While the link between shorter public waiting times for SHI holders and longer waits for non-SHI individuals is a model assumption, it is grounded in institutional features of the Swedish system. Formally, the sign of ΔW_{Q1} in the baseline hinges on $X_{Q1}^w > CS_{Q1} - X_{Q1}^q$. The comparison clarifies that the distributional tension partly arises from access reallocation under fixed public capacity rather than from public cost financing per se.

Rows (3) and (4) vary the monetary weight on waiting-time reductions, i.e. the parameter λ entering $\Delta u_{g,S}$ and X_g^w. In Row (3), λ is allowed to vary by income group, so that $\Delta u_{g,S}$ reflects heterogeneous willingness to pay, based on the highest and lowest decile estimates in Russo (2023). This modifies both private gains and congestion costs proportionally. The resulting ΔW_g changes modestly, notably increasing ΔW_{Q1} to around zero; however, the key takeaway is that the baseline distributional ranking is not an artifact of homogeneous valuation. Row (4) adopts an average contracted compensation benchmark in the Swedish insurance market (SEK 300 per day of delayed care), mechanically increasing λ for all groups. Both CS_g and X_g^w scale upward. The widening gap between ΔW_{Q1} and ΔW_{Q4} shows that higher waiting-time valuation amplifies distributional differences: when time costs are weighted more heavily, unequal coverage translates into larger welfare disparities. Together, Rows (3) and (4) demonstrate that the unequal net benefits are robust to alternative calibrations of waiting-time preferences and, if anything, become stronger when time costs are valued more highly.

Rows (5) and (6) alter the enrollment vector $\{S_g\}$ while holding per-enrollee components $\Delta u_{g,S}$, X_g^q, and X_g^w fixed. In Row (5), enrollment is made uniform across income groups, $S_g = \bar{S}$. Because CS_g scales with S_g, compressing enrollment compresses the dispersion in ΔW_g. Both quartiles experience positive net value, and the gap narrows substantially. This indicates that unequal coverage—rather than heterogeneous per-enrollee treatment effects—is the primary source of distributional asymmetry.

Row (6) instead scales aggregate coverage upward, increasing S_g proportionally for all groups. In a capacity-constrained system, higher S increases congestion costs through X_g^w, which depend on aggregate SHI penetration. As coverage expands, ΔW_{Q4} remains positive while ΔW_{Q1} becomes more negative, illustrating that the regressive component intensifies with market expansion absent offsetting increases in public capacity. This counterfactual shows that scaling SHI mechanically amplifies congestion-driven redistribution.

Across scenarios, three lessons emerge. First, the sign pattern in ΔW_g is robust to alternative valuations of waiting time, indicating that preference heterogeneity is not the driver of unequal net benefits. Second, congestion externalities are the central mechanism

generating negative net value for lower-income groups. Third, the distribution of enrollment rates $\{S_g\}$—rather than heterogeneity in per-enrollee surplus—is the dominant determinant of aggregate distributional outcomes. Dispersion in ΔW_g arises primarily through cross-group differences in S_g interacting with congestion terms that scale with aggregate coverage. The counterfactual exercises therefore clarify that SHI improves access on a per-enrollee basis, but unequal coverage in a capacity-constrained public system redistributes both gains and congestion costs in a regressive direction.

Table H.2: Net values of SHI: sensitivity and counterfactuals

	Income Q1			Income Q4		
Scenario	Value	Externality	Net value	Value	Externality	Net value
Panel (a): Baseline						
(1) Baseline	79	117	-37	468	98	370
Panel (b): Waiting times						
(2) No congestion externality	79	60	19	468	60	408
(3) Heterogeneous λ_g^w	71	68	3	604	229	375
(4) SHI Waiting-Time Payout λ_{SHI}^w	120	300	-180	1433	221	1212
Panel (c): Enrollment						
(5) Uniform enrollment	176	93	83	185	75	110
(6) Expanded enrollment	174	318	-144	949	249	700

Note: This table reports robustness checks and counterfactual exercises for the distributional analysis, focusing on the bottom and top income quartiles. **Row (1)** presents the baseline results corresponding to Figure 9d. Aggregate consumer surplus for group g is defined as $CS_g = S_g \times \Delta u_{g,S}$. Aggregate cost externalities are computed under the assumption that these externalities are shared equally across the population: $X_g^q = S \cdot \Delta q^0$. Congestion externalities are borne by the uninsured and allocated across income groups in proportion to healthcare utilization among uninsured individuals. Let Δu_{noS} denote the average congestion externality for the uninsured and $q^0_{g,\text{noS}}$ denote public healthcare utilization among uninsured individuals in group g. The resulting congestion burden for group g is $X_g^w = \frac{(1-S_g)\, q^0_{g,\text{noS}}}{\sum_{h=1}^4 (1-S_h)\, q^0_{h,\text{noS}}} \cdot \Delta u_{\text{noS}}$. Net value is given by $\Delta W_g = CS_g - (X_g^q + X_g^w)$. We assess robustness to the choice of λ, the value of a one-day reduction in waiting time for care. In **Row (2)**, we set the congestion parameter to zero. This corresponds to a benchmark in which the public system can absorb the reduction in wait times for SHI holders without generating spillovers to wait times for individuals without SHI, i.e., the marginal change in public capacity faced by the uninsured is zero. In **Row (3)**, λ is allowed to vary by income group, using group-specific values corresponding to the bottom and top income willingness-to-pay for a one-day shorter wait reported in Russo (2023). In **Row (4)**, we instead use a value of λ based on the daily compensation paid by insurance companies when statutory waiting-time guarantees are not met (SEK 300 per day), scaled by the average cost per specialist and hospital visit observed in our data (SEK $5,287$). We then conduct counterfactual analyses that alter the distribution of SHI coverage across the income distribution using the baseline scenario. In **Row (5)**, we impose a uniform enrollment rate equal to the average SHI enrollment between 2008 and 2015 (approximately 8.1%). **Row (6)** reports the counterfactual resulting from a proportional tripling of the SHI market, yielding average coverage rates comparable to those observed in Finland (see Table A.1).

VIII.A Bounding Welfare Under Alternative Marginal Values of Healthcare

Our baseline empirical implementation defines net social value for income group g as

$$\Delta W_g = CS_g - (X_g^q + X_g^w), \tag{H.1}$$

where CS_g is private consumer surplus, X_g^q the fiscal (quantity) externality from increased publicly financed care, and X_g^w the congestion externality operating through waiting times.

This formulation adopts a hedonic (willingness-to-pay–based) approach, under which the marginal social value of induced healthcare spending is implicitly set equal to its resource cost. In addition, it abstracts from risk aversion by treating consumer surplus as a sufficient statistic for welfare, thereby shutting down the insurance value of coverage. Under these assumptions, induced medical spending contributes neither a resource gain nor loss, so welfare differences are driven by private surplus and external spillovers.

These assumptions are restrictive. In canonical price-based insurance models, coverage induces utilization beyond the efficient margin, implying marginal value below marginal cost (Pauly, 1968; Manning et al., 1987; Einav et al., 2010; Finkelstein et al., 2012; Einav and Finkelstein, 2018). Moreover, with risk-averse agents, coverage provides insurance value that is not captured by consumer surplus alone. In such settings, additional utilization reduces surplus at the margin and induced spending would enter the welfare measure with a negative contribution. In contrast, when care is rationed by non–price mechanisms, marginal care may be underprovided, so additional utilization can be valued at or above cost (Besley, 1989; Blomqvist and Johansson, 1997; Shepard et al., 2020). To accommodate both cases without committing to a calibration, we parameterize the marginal value of induced care.

Let ΔX_g denote induced healthcare spending for group g. Define θ as the marginal social value of induced spending relative to its resource cost. Then the net resource contribution of induced care is $(\theta - 1)\Delta X_g$, and net social value becomes

$$\Delta W_g(\theta) = CS_g + (\theta - 1)\Delta X_g - (X_g^q + X_g^w). \tag{H.2}$$

The baseline corresponds to $\theta = 1$; $\theta < 1$ captures welfare losses from induced low-value care, while $\theta > 1$ captures the possibility that SHI relaxes binding access distortions.

Varying θ changes only the valuation of induced spending and leaves externalities unchanged. Accordingly, Table H.3 implements the sensitivity exercise by adjusting only the *Value* column through $(\theta - 1)\Delta X_g$, holding the *Externality* column fixed; net value shifts mechanically with θ. The results show that net value among low-income groups is sensitive to whether induced utilization reflects moral hazard or the relaxation of access constraints, whereas conclusions for high-income groups are robust to even very pessimistic assumptions about the marginal value of induced care, reflecting again that high-income groups derive more of their value through shorter wait times.

Break-even marginal value. A convenient sufficient statistic is the break-even value θ_g^* satisfying $\Delta W_g(\theta_g^*) = 0$:

$$\theta_g^* = 1 + \frac{X_g^q + X_g^w - CS_g}{\Delta X_g}. \tag{H.3}$$

Table H.3: Net values of SHI: sensitivity to marginal value of care

	Income Q1			Income Q4		
Scenario	Value	Externality	Net value	Value	Externality	Net value
Panel (a): baseline						
Baseline ($\theta = 1$)	79	117	-37	468	98	370
High marginal value ($\theta = 1.2$)	92	117	-25	497	98	399
Low marginal value ($\theta = 0.8$)	67	117	-50	438	98	340
Very low marginal value ($\theta = 0.5$)	48	117	-69	394	98	296
Panel (b): with heterogeneous λ_g^w						
Baseline ($\theta = 1$)	71	68	3	604	229	375
High marginal value ($\theta = 1.2$)	84	68	16	633	229	404
Low marginal value ($\theta = 0.8$)	59	68	-9	575	229	346
Very low marginal value ($\theta = 0.5$)	40	68	-28	531	229	302

Note: This table reports sensitivity of net social value to alternative assumptions about the marginal social value of induced healthcare spending. Results are shown for the bottom and top income quartiles. Net social value for group g is defined as $\Delta W_g = CS_g - (X_g^q + X_g^w)$, where CS_g denotes private consumer surplus, X_g^q the fiscal (quantity) externality from increased publicly financed care, and X_g^w the congestion externality operating through waiting times. We introduce a parameter θ capturing the marginal social value of induced healthcare spending relative to its resource cost. Induced spending for group g is denoted ΔX_g. Under alternative values of θ, net social value becomes $\Delta W_g(\theta) = CS_g + (\theta - 1)\Delta X_g - (X_g^q + X_g^w)$. The baseline corresponds to $\theta = 1$, under which induced care is valued at cost. **Panel (a)** reports sensitivity under the baseline specification of externalities. **Panel (b)** repeats the exercise under heterogeneous waiting-time valuations λ_g^w as in Table H.2. Across rows, only the *Value* column changes with θ, reflecting the adjustment $(\theta - 1)\Delta X_g$. Fiscal and congestion externalities are held fixed. Net value therefore shifts mechanically with θ, capturing alternative assumptions about whether induced care reflects moral hazard ($\theta < 1$) or the correction of access distortions ($\theta > 1$). All monetary values are expressed in SEK per enrollee per year.

When $\theta_g^* > 1$, positive net value requires induced care to correct underprovision. When $\theta_g^* < 1$, SHI remains welfare improving even if induced care is partially low-value; $\theta_g^* < 0$ indicates robustness even to extremely pessimistic valuations.

Applying this formula to Panel (a) of Table H.3 yields sharply different thresholds across the income distribution. For the bottom income quartile (Q1), $\theta_{Q1}^* \approx 1.6$, implying that SHI generates positive net value only if induced care is substantially above cost at the margin. For the top income quartile (Q4), $\theta_{Q4}^* < 0$, implying that net value remains positive even under very pessimistic assumptions about the marginal value of induced care.