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Buying the Exit Option: Private Insurance in a Universal Health System – Evidence from Portugal, 2005-2019

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Buying the Exit Option: Private Insurance in a Universal Health System - Evidence from Portugal, 2005-2019

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Abstract

This paper documents a near-tripling of voluntary private health insurance coverage in Portugal across three national health surveys and argues, using complementary empirical strategies, that this expansion reflects exit-option demand from a rationed public system rather than conventional risk pooling. The income gap in coverage widened during the 2010-2014 austerity shock and partially unwound during recovery. An Oaxaca-Blinder decomposition attributes roughly 89 percent of the 2005-2014 expansion to behavioral change, while a triple-difference design provides directionally consistent evidence that high-need, high-income individuals drove the austerity-period growth. The findings have direct implications for the design of universal health systems that accommodate supplementary private coverage.

Keywords

Private health insurance; exit option; universal health system; austerity; income inequality; Portugal

JEL Classification

113; 114; 118; H51;D12

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1. INTRODUCTION

Between 2005 and 2019, the share of the Portuguese population holding private health insurance nearly tripled, rising from 10 to 25 percent, inside a system that had provided universal public coverage since 1979. This expansion was not neutral. In every survey year, private coverage was three to four times more common among high-income respondents than among the lowest income group, and similarly concentrated among the tertiary-educated. These gaps persist after accounting for age, sex, and self-assessed health. Portugal did not become less universal: the National Health Service (SNS) still covers everyone. What changed is that a privately purchased exit from its queues and constraints became progressively more common and progressively more stratified. This paper studies that process.

The timing of the expansion is striking. The sharpest growth, from 9.9 to 19.7 percent of the population, occurred between the 2005 and 2014 surveys, coinciding almost exactly with Portugal's 2010-2014 austerity program under IMF and EU conditionality. Public health expenditure fell by more than 10 percent in real terms between 2010 and 2013. User co-payments were raised, staffing was cut, and waiting lists for specialist consultations and elective procedures lengthened substantially. By 2014, the median waiting time for a specialist appointment had roughly doubled relative to pre-crisis levels. Private insurance grew fastest precisely when the public system became most constrained. That pattern motivates the central hypothesis of this paper: in a universal health system with binding capacity constraints, voluntary private insurance operates primarily

as a purchased exit from public-sector rationing rather than as a conventional riskpooling product.

This exit option framing draws on Hirschman's (1970) classic analysis of voice, exit, and loyalty. When users of a public service can purchase an alternative, they exercise exit

rather than pressing for improvement. The mechanism has a systemic dimension: if the citizens most capable of influencing public-sector quality, that is, the educated, the wealthy, and the politically engaged, disproportionately exit, they reduce the political pressure that sustains SNS investment. The findings of this paper are consistent with this dynamic. Private insurance expanded fastest among the groups with the greatest capacity to voice, and the gap between income groups widened during the period of most severe public-sector degradation.

The paper connects to three strands of the health economics literature. The first is the classical analysis of insurance demand under uncertainty. Arrow (1963) established that asymmetric information and the non-contractibility of care distinguish medical markets from standard commodity markets. Einav and Finkelstein (2011) show that selection in insurance markets is shaped by preference heterogeneity as much as by adverse selection in risk. The present paper argues that in universal systems a third force operates, selection on the value of exit, which is determined by the perceived quality of the public alternative rather than by individual health risk alone.

The second strand is the empirical literature on voluntary private health insurance in universal systems. Mossialos and Thomson (2002) and Sagan and Thomson (2016) document that private insurance plays different roles

(substitutive, complementary, or supplementary) depending on institutional design. Kiil's (2012) review establishes that ownership is consistently concentrated among high socioeconomic status (SES) individuals across universal systems. The closest comparators to the present paper are Besley, Hall, and Preston (1996) and Propper (2000), who show for the United Kingdom that NHS waiting lists directly raise private insurance demand, and Jofre-Bonet (2000), who formalizes waiting time as the link between public performance and private demand. We bring this mechanism to Portugal and ask a question these papers

do not: is the behavioral response to SNS degradation itself socially stratified?

The third strand concerns the welfare implications of private-public coexistence. Costa-Font and Jofre-Bonet (2008) test whether private insurance uptake erodes political support for public health systems, the Hirschman externality in empirical form. Le Grand (2007) argues that choice and competition within public services can promote equity if properly designed, while Enthoven's (1985) managed competition proposals for the NHS offer a blueprint for harnessing private provision without abandoning universalism. This paper contributes evidence that bears directly on that policy debate: it shows that unmanaged coexistence of universal coverage and voluntary private insurance produces widening stratification, not neutral complementarity.

The empirical analysis draws on three Portuguese National Health Surveys (2005, 2014, 2019) that straddle the austerity shock. We use complementary strategies: logistic models with income-year interactions to test whether the income gap widened during austerity, a triple-difference design crossing income

group, health need, and survey year, and an Oaxaca-Blinder decomposition separating compositional from behavioral change.

Three findings support the exit option interpretation. The income gap in coverage widened sharply between 2005 and 2014 and stabilized during recovery. Among high-income individuals with poor health, those most exposed to SNS queues, coverage grew faster during austerity than among healthy counterparts. An Oaxaca-Blinder decomposition attributes roughly 89 percent of the 2005- 2014 expansion to behavioral change rather than demographic shifts, with this share rising to 94 percent in the recovery period.

The paper makes three contributions. It provides individual-level evidence on the expansion of private insurance in Portugal across three national surveys. It advances an exit

option framing that generates testable hypotheses connecting insurance demand to SNS quality. And it shows that private insurance concentrates among the wealthy and the healthy, not the sick, meaning that access, not risk, drives demand. This challenges the standard justification for tolerating private coverage in universal systems.

The remainder of the paper is organized as follows. Section 2 presents the conceptual framework, preceded by a brief description of the Portuguese SNS and the austerity shock that motivates the analysis. Section 3 describes the data and empirical strategies. Section 4 presents the results. Section 5 discusses implications for SNS design. Section 6 concludes.

2. CONCEPTUAL FRAMEWORK

The Portuguese National Health Service *(Servigo Nacional de Saude,* SNS) was established by the 1979 Basic Health Law, granting all residents the right to health care financed through general taxation and provided free at the point of use, a Beveridge-type architecture closely modeled on the original British NHS (Simoes, et al., 2017). The SNS has always coexisted with private providers, a substantial out-of-pocket sector, and occupational health subsystems, of which the largest is ADSE, covering public-sector employees (Barros & Costa, 2022). The system came under severe fiscal pressure following the 2011 Memorandum of Understanding between Portugal, the European Commission, the European Central Bank, and the International Monetary Fund: public health expenditure fell by more than ten percent in real terms between 2010 and 2013, user co-payments were raised, staffing was reduced, and median waiting times for specialist consultations approximately doubled relative to pre-crisis levels (Karanikolos, et al., 2013; Simoes, et al., 2017). It is against this backdrop that the private insurance market expanded most sharply: the voluntary private health insurance sector grew from a marginal complement to a visible and increasingly stratified layer of access operating alongside a

formally universal but capacity-constrained public system (Giraldes, 2003; Barros & Costa, 2022).

This section develops a reduced-form model of voluntary private health insurance demand in a universal health system. The model has three purposes. First, it formalizes the distinction between private insurance as a risk-poo ling product and private insurance as an exit option from public-sector rationing. Second, it derives comparative statics that generate testable hypotheses distinguishing the exit option mechanism from the standard adverse-selection and income-effect alternatives. Third, it identifies a welfare externality, the Hirschman
feedback from exit to public-sector quality, that motivates the policy discussion in Section 5.

In a standard insurance model without a public alternative, individuals face uncertain medical expenditure and purchase coverage to smooth consumption (Arrow, 1963; Cutler & Zeckhauser, 2000). The demand for insurance in that setting is driven by risk aversion and by the probability and magnitude of health expenditure. Selection arises because individuals know more about their own health risk than insurers do: higher-risk individuals are more willing to pay the premium, generating adverse selection (Rothschild & Stiglitz, 1976) or, when advantageous selection operates, the opposite pattern (Einav & Finkelstein, 2011).

In a universal health system, the structure of demand changes fundamentally. Public coverage eliminates the financial risk of medical expenditure for the entire population. Private insurance therefore cannot be primarily a financial risk-management product, because the financial risk being insured against has already been socialized. What private insurance can provide instead is access to care that is faster, more convenient, or of higher perceived quality than the public system offers. In a system with binding capacity

constraints (queues, rationing by waiting time, and limited specialist availability), private insurance provides a purchased exit from those constraints. The relevant uncertainty is not financial; it is the uncertainty of when, whether, and under what conditions the public system will provide care.

This distinction has two immediate implications. First, the income gap in demand should be larger under the exit option mechanism than under the riskpooling mechanism. Purchasing exit from public queues is a normal good: higher

income increases both the willingness to pay the premium and the opportunity cost of time spent waiting. Risk-pooling demand, by contrast, is shaped primarily by risk aversion and health status, which are distributed across the income distribution. Second, the demand for exit should be sensitive to the quality of the public system in a way that risk-pooling demand is not: when SNS waiting times lengthen, the option value of exiting rises, and demand for private insurance increases even among individuals whose health status has not changed. This second implication generates the empirically testable hypotheses that motivate the analysis.

2.1 A Reduced-Form Model

Consider a population of individuals indexed by i. Each individual is characterized by income y,> 0 and health need $h_t > 0$, where *hi* measures the individual's expected utilization of health care services in the absence of financial barriers. The public system provides care at a co-payment c > 0 but imposes a waiting cost that is proportional to both need and the aggregate level of SNS congestion. Let w > 0 denote the waiting cost per unit of health need, a parameter that is common to all individuals and determined by public health expenditure, SNS capacity, and aggregate demand for care. The expected utility of relying exclusively on the public system is:

$$EiuHHsiy\hat{}\hat{}\} = u(yt - c) - w * hi, \tag{1}$$

where $u(.)$ is a strictly increasing, concave utility function defined over net income after co-payments. The term $w * hi$ captures the non-monetary cost of queuing: individuals with greater health need are exposed to the public system's rationing more frequently and therefore bear a larger waiting cost.

Private insurance is offered at a premium $p, > 0$. For simplicity, we treat the premium as weakly increasing in health need, reflecting actuarial pricing or community rating with group selection, and assume that private coverage eliminates waiting costs entirely. The expected utility of purchasing private insurance is:

$$E\{u_{priv(ytihd}] = \qquad - \mathrm{Pi})- \tag{2}$$

Individual i purchases private insurance if and only if $E\backslash u_{vri}\hat{} > E\{u_{NHS}\},$ that is, if:

$$u(y_t - pd - u(yt - c) > -w * hi. \tag{3}$$

The left-hand side of (3) is the net utility cost of the premium relative to the co-payment, which is negative when $p_t > c,$ i.e. the premium exceeds the copayment. The right side is minus the waiting cost, which is negative when $w > 0$. Condition (3) therefore reduces to: the waiting cost $w * hi$ must exceed the net utility cost of paying the private premium rather than the SN S co-payment. Rearranging:

$$w * hi > u(y_t - \mathrm{c}) - u(y_t - p_t) = 6(y_t, pt, c), \tag{4}$$

where $6(yt, pt, c)$ denotes the utility cost of switching from SNS co-payment to private premium, evaluated at income y_t. The individual's insurance decision is therefore governed by whether the exit benefit given by the left-hand side of Equation (4) exceeds the exit cost given by $6(yi, Pi,$ c).

2.2 Comparative Statics and Testable Hypotheses

Four comparative statics follow from condition (4), each generating a
testable hypothesis summarized in Table 1.

Effect of SNS congestion. Differentiating condition (4) with respect to *w,* the probability of purchasing private insurance is strictly increasing in *w* for all individuals with *hi* > 0. When SNS waiting times lengthen, as they did during Portugal's 2010-2014 austerity program, the exit benefit rises for all individuals who use health care, and demand for private insurance increases. This implies that the 2005-2014 expansion should not be fully explained by changes in income or demographic composition; a structural shift in the propensity to insure is expected.

Effect of income. By the concavity of «(■), *6(yi, Pi, c)* is decreasing in y_t*:* wealthier individuals face a lower utility cost from paying the private premium rather than the co-payment. The probability of insuring is therefore increasing in income, holding need and waiting time constant. Moreover, the marginal response to an increase in *w* is larger for higher-income individuals, who are closer to the indifference threshold, so an austerity shock produces a wider income gap rather than a parallel upward shift.

Interaction of income and health need. The exit benefit equals *w* * *hi,* generating a complementarity between income and health need: the individual who most clearly satisfies condition (4) is both affluent enough to afford the premium and in sufficient need to face SNS queues frequently. The income gap should therefore be larger within the high-need group, and this difference should be most pronounced at peak austerity.

Effect of premium risk-rating. When premiums are actuarially risk-rated, p_t
is increasing in *hi,* and *S* r rises with need for a given income. At low income, high-need individuals have the largest exit benefit but also face the highest premium cost; at high income, neither constraint binds. The predicted cross- sectional pattern is therefore: private insurance is more common among the healthy at low income (lower premiums), but this negative health association should attenuate or reverse at G4 during high- *w* periods. This is the sharpest distinguishing hypothesis of the exit option model: pure advantageous selection (Einav & Finkelstein, 2011) predicts a negative health association regardless of year or income level.

Table 1. Testable Hypotheses of the Exit Option Model

	Mechanism	Predicted pattern	Empirical test	Rejected by:
1	SNS congestion (1W)	Structural change dominates the 2005-2014 expansion; behavioral response exceeds compositional shift	Oaxaca-Blinder (Strategy 3)	Compositional change accounts for most of the expansion
2	Income effect	Income gap widens during austerity (2005-2014); stabilizes or narrows in recovery (2014-2019)	Income-year interactions (Strategy 1)	Parallel upward shift; gap constant across periods
3	Income x health need	Income gap larger within the bad-health group; difference grows at 2014	Triple difference (Strategy 2)	Equal income gap for healthy and unhealthy in all years
4	Premium riskrating	Negative health-insurance association overall; attenuates at G4 during austerity	Strategies 1-3 combined	Uniform negative health association at all income levels

2.3 Endogenous SNS Quality and the Hirschman Externality

The model in Section 2.1 treats the SNS congestion parameter w as exogenous, determined by government expenditure and capacity decisions. In practice, w is at least partially endogenous to the exit decisions of the population.

This endogeneity is the source of the welfare externality that motivates the policy analysis in Section 5.

Following Hirschman (1970), consider a political economy in which SNS quality, and therefore the level of w, depends on the political pressure exercised by the population that remains in the public system. Citizens who use the SNS have an incentive to exercise voice: to lobby, vote, and organize in favor of SNS investment. Citizens who have exited to private insurance have reduced their dependence on the public system and correspondingly less incentive to advocate for it. If the individuals who exit are disproportionately high-income and highly educated, and therefore have greater political capacity and civic influence, their exit may reduce the quality and intensity of advocacy for SNS investment. This produces a feedback loop: *High w -> Exit by high SES individuals -> Reduced political pressure for NHS -> Higher w.*

This feedback is a negative externality of private insurance exit: each individual's decision to purchase private coverage reduces, at the margin, the political support for the public system that other

individuals depend on. The externality is not priced into the private premium and will not be corrected by an unregulated market. It provides an economic rationale for regulating the interaction between private insurance and the public system, beyond the standard market-failure arguments about adverse selection.

The magnitude of the externality depends on two empirical quantities. The first is the degree to which private insurance uptake is concentrated among the politically influential: if exit is uniformly distributed across the income and education distribution, the voice loss is proportional to the share of the population

exiting and the feedback is modest. If exit is concentrated among high-SES individuals, as the data in this paper show, the voice loss is disproportionate relative to the share exiting, and the feedback is correspondingly larger. The second is the elasticity of SNS political support with respect to exit: if SNS investment is determined by universal franchise and median-voter preferences rather than by the intensity of organized advocacy, the feedback may be weak. Costa-Font and Jofre-Bonet (2008) provide empirical evidence that private insurance uptake does reduce stated preferences for NHS spending in the United Kingdom, suggesting the externality is quantitatively meaningful.

The Hirschman feedback also explains why the 2014-to-2019 expansion of private insurance did not reverse when SNS quality partially recovered after austerity. The model with endogenous w admits multiple equilibria. A high- w equilibrium, in which substantial exit by high-SES individuals depresses political support for SNS investment, sustaining high congestion and continued exit demand, can be self-reinforcing. Entry into private insurance may therefore exhibit hysteresis: once individuals exit, their political preferences and civic behavior adjust, and they do not return to exclusive SNS use even when the immediate impetus, namely the austerity shock, has passed. This mechanism is consistent with the empirical pattern in Section 4, where the income gap does not narrow in the recovery period.

3. DATA AND EMPIRICAL STRATEGY

The empirical analysis uses individual-level microdata from three Portuguese National Health Surveys (Inquerito Nacional de Saude, INS): the 2005/2006 survey, the 2014 survey, and the 2019 survey. The surveys are conducted by

Statistics Portugal (INE) in collaboration with the National Institute of Health (INSA) and provide nationally representative, cross-sectional information on the health, health behavior, and insurance status of the resident population. The three surveys are treated as independent cross-sections; the same individuals are not followed over time.

The sample is restricted to respondents aged 15 and above to ensure comparability across surveys, since the 2014 and 2019 surveys target this age group while the 2005/2006 survey additionally covers younger household members. After this restriction and excluding observations with missing values on the main variables, the baseline analytical sample contains 67,184 observations: 34,507 in 2005, 18,160 in 2014, and 14,517 in 2019. An extended sample, which additionally requires non-missing self-assessed health, contains 56,137 observations.

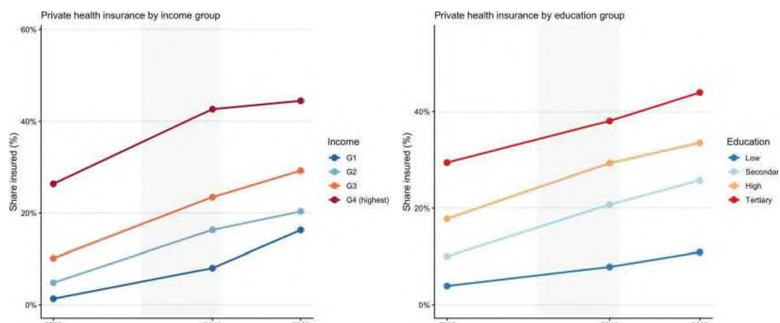
The main covariates are survey year, sex, age group (eight categories), education group (four categories), and income group (four groups). An extended specification adds self-assessed health (three categories). All models apply survey weights. Table 2 reports the weighted composition of the sample and the weighted private insurance ownership rate by socioeconomic group across the three survey years. Figure 1 plots ownership rates by income and education groups over time, with the 2010-2014 austerity period shaded.

Table 2. Sample composition and private health insurance ownership by socioeconomic group

	2005	2014	2019	Change 2005-2019
Weighted sample composition (%)				
Education group				
Low education	58.9	43.9	38.7	
Lower secondary	14.4	19.5	18.8	
Upper secondary/post-secondary	14.5	19.6	23.0	
Tertiary	12.2	17.0	19.5	
Income group				
G1	23.2	40.0	40.1	
G2	29.0	20.1	20.0	
G3	27.2	19.9	19.8	
G4 (Highest)	20.6	20.0	20.0	
Weighted private insurance ownership rate (%)				
Overall	9.9	19.7	25.3	+15.4
Education group				
Low education	3.9	7.9	10.9	+7.0
Lower secondary	10.0	20.7	25.8	+15.7
Upper secondary/post-secondary	17.8	29.3	33.5	+15.7
Tertiary	29.4	38.0	43.9	+14.5
Income group				
G1	1.4	8.0	16.3	+14.9
G2	4.9	16.3	20.4	+15.5
G3	10.2	23.5	29.3	+19.1
G4	26.4	42.7	44.5	+18.1

Portuguese National Health Surveys, 2005, 2014, and 2019, weighted sample composition by both survey year. Income groups G1-G4.

Figure 1. Private health insurance, Portugal 2005-2019



Weighted share of respondents aged 15 and above reporting private health insurance, by income group (Gl- G4) and education group, across survey' years. The shaded band marks the 2010-2014 austerity' period. Survey-weighted estimates. Source: Portuguese National Health Surveys 2005, 2014, 2019.

Table 2 and Figure 1 together document two features of the data that motivate the analysis. First, private insurance ownership expanded substantially across all socioeconomic groups: the overall rate rose from 9.9 percent in 2005 to 25.3 percent in 2019. Second, the expansion was unequally distributed. In every survey year, ownership is strongly concentrated at the top of the income and education distributions. Among G4, coverage stood at 26.4 percent in 2005 and reached 44.5 percent by 2019. Among the G1 it rose from 1.4 to 16.3 percent over the same period. The gap between G4 and G1 widened between 2005 and 2014, the period coinciding with peak austerity, and narrowed between 2014 and 2019 as SNS conditions partially improved. The descriptive pattern is consistent with the exit option hypothesis developed in Section 2 and tested formally in Section 4.

The timing of the three surveys is central to the empirical design. The 2005 survey provides a pre-austerity benchmark. The 2014 survey captures the population immediately after the most severe phase of Portugal's fiscal adjustment, when SNS expenditure, staffing, co-payments, and waiting times

were all under pressure. The 2019 survey provides a recovery-period comparison, after the adjustment program had ended and public health expenditure had partly recovered. This

sequence allows the analysis to examine whether private insurance grew disproportionately among the groups for whom exit from SNS constraints was most valuable, and whether that pattern changed once publicsector conditions improved.

3.1 Baseline Model

The baseline analysis estimates survey-weighted logistic regression models of the form:

$$Pr(Plt = l|Xj) = A(a + p_t year_t + yX\hat{}, \qquad (5)$$

where Pl_t indicates whether individual i has private insurance, A is the logistic cumulative distribution function, $year_t$ are indicators for 2014 and 2019 with 2005 as the reference category, and X_t is a vector of individual controls including sex, age group (eight categories), education group (four categories), and income groups (four categories). An extended specification adds self-assessed health (three categories) to assess whether the income-education disparity reflects health need or socioeconomic advantage independently of need. All models are estimated within a design-based framework for complex survey data following Binder (1983) and Lumley (2004; 2010), using a quasibinomial specification to obtain robust standard errors. Odds ratios are reported throughout.

The baseline models establish the magnitude and statistical significance of the time trend and the income-education disparities, replicating and extending the existing descriptive literature. Their primary limitation is that the year indicators identify the total change in the propensity to insure across all groups

simultaneously, without distinguishing whether the change was concentrated among the groups most exposed to SNS degradation. The three strategies below address that limitation.

3.2 Strategy 1: Differential Gap Widening

The exit option hypothesis predicts that the income-education gap in private insurance should widen more sharply during the period of SNS degradation (2005 to 2014) than during the recovery period (2014 to 2019). A pure income-growth alternative in which the expansion of private insurance simply reflects rising real incomes and education levels, predicts monotone, proportional growth in this gap across both periods. To test this, we estimate two interaction models. The first adds year-by-income-group interactions to the baseline specification:

$$\Pr(P/i = 1120 = A(a + fryeay + 6_{tq} y_g + yZt), \qquad (6)$$

where y_g is a vector of income group indicators and *Z,* includes sex, age group, and education group. The second replaces income with education group interactions. For each model we report the joint F-test of the interaction terms and predicted probabilities by socioeconomic group in each survey year, computed at reference values for other covariates.

The key test is a Wald contrast comparing the incremental income premium at 2019 relative to 2014. Specifically, we test H_o-. (year$_2$oi9 x *ys) — (year*$_{2014}$ x y_5) = 0, using the survey-adjusted variance-covariance matrix. A failure to reject this null, i.e. an absence of incremental gap growth in the recovery period, is consistent with the exit option hypothesis combined with hysteresis: individuals who purchased private insurance during austerity retained

it after the SNS partially recovered, rather than returning to exclusive SNS use. Rejection, by contrast, would support the income growth alternative.

3.3 Strategy 2: Triple Difference

The exit option and the pure income effect make different hypotheses about the role

of health need. Under the exit option mechanism, the value of exiting the public system is highest for individuals who both need care frequently, and therefore encounter SNS queues directly, and have the resources to purchase an alternative. The exit option therefore predicts that high-income individuals with poor self-assessed health should show the strongest increase in private insurance during austerity. Under a pure income effect, income matters regardless of health status, and the income gap should be equally large for healthy and unhealthy individuals across all years. We test this through a three-way interaction model: $Pr(PIi = l|Xj) = A(a + (fyear, + 6_{tg}y_g + t|>h_c + 6_{tg}\ year_t\ xy_g x h_c + yZ\text{^}$

$$(7)$$

where h_c indexes the three self-assessed health categories (good/very good, fair, bad/very bad). The joint F-test on the three-way interaction 9_{tgh} is the primary test of whether the income response to austerity differed by health need. We further examine predicted probabilities across income-health profiles, distinguishing between high and low-income individuals reporting good versus bad health in each survey year. The exit option hypothesis predicts that the income gap is widest in 2014, particularly within the bad-health group. We complement this with a stratified analysis, re-estimating the year-by-income interaction model separately on good-health and bad-health subsamples, and comparing the magnitude of the change in the income gap across the two groups.

The triple difference does not require an external control group. The selfassessed health dimension serves as a within-country, within-survey differentiator of exposure to SNS capacity constraints: individuals who need care more frequently are more exposed to the queues that the exit option alleviates. The identification assumption is that, in the absence of austerity, the income gap in private insurance would have evolved similarly for high-need and low-need individuals. This assumption is plausible but not directly testable with three crosssections, we treat the triple difference as a consistency test rather than a

fully identified causal estimate.

3.4 Strategy 3: Oaxaca-Blinder Decomposition

The aggregate change in private insurance coverage between surveys combines two distinct forces: compositional change (the population became richer, more educated, and differently distributed across age and sex groups) and structural change (individuals in a given socioeconomic position became intrinsically more likely to hold private insurance, conditional on their characteristics). These two forces are not observationally equivalent: the exit option hypothesis predicts that structural change, i.e. a shift in the conditional propensity to insure, dominates the 2005-to-2014 period, because austerity changed the incentive to exit irrespective of the evolution of income or education. A pure income-growth story predicts that compositional change dominates in both periods.

We implement a Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) separately for each adjacent survey pair. For a given pair (survey A, survey

B), we estimate survey-weighted linear probability models on each survey separately:

$$E[PIi \backslash Xi, survey - t] - a, + X'p, \qquad (8)$$

where X_t includes sex, age group, education group, and income group. The total change in the weighted mean outcome is then decomposed as:

$$Pi_B - Pl_A = \underbrace{P'_A * (X_B - X_A)}_{\text{Composition effect}} + \underbrace{X'_B * (p_B - P_A)}_{\text{Structure effect}} \qquad (9)$$

where X and P denote the weighted mean characteristics and estimated coefficients in survey t, and survey A's coefficients serve as the reference (Blinder, 1973). The composition term captures the change attributable to shifting demographic and socioeconomic composition; the structure term captures the change attributable to shifting coefficients, that is, to changes in the conditional propensity to insure given observed

characteristics. We use the linear probability model rather than logistic regression for this decomposition because the linear decomposition is exact and directly interpretable in probability units; log-odds decompositions require additional assumptions about the distribution of the latent index. Weighted column means of the model matrix are used throughout to ensure representativeness.

We report decompositions for two periods: 2005 to 2014 (the austerity shock) and 2014 to 2019 (the recovery). Comparing the composition and structure shares across the two periods provides evidence on whether the mechanism changed: if austerity generated exit-option demand, we expect structural change to account for a larger share of the 2005-2014 expansion than of the 2014-2019 continuation.

4. RESULTS

Table 3 reports odds ratios from the baseline and extended survey-weighted logistic regression models. Relative to 2005, the odds of reporting private insurance were 2.38 times higher in 2014 and 3.41 times higher in 2019 after controlling for individual characteristics, confirming that the expansion was not driven solely by changes in the composition of the population.

The income association is the largest single effect in the model. Middle to high income groups (G2, G3, and G4) show progressively stronger associations relative to low-income group (Gl). The relationship is non-linear and convex: moving from Gl to G2 multiplies the odds by 1.48, from G2 to G3 by a further 1.41, and from G3 to G4 by roughly double again, reaching an odds ratio of 4.19 for G4 relative to Gl. The largest single step in the income distribution is between G3 and G4. In the linear probability specification, individuals in G4 are 20.1 percentage points more likely to hold private insurance than those in Gl, compared with 7.6 points for G3 and 3.6 points for G2.

Education shows a strong and consistent pattern. Tertiary-educated individuals had

2.74 times the odds of holding private insurance relative to those with low education. In the extended model, these associations persist after controlling for self-assessed health. Critically, self-assessed health is negatively associated with private insurance ownership (fair health OR 0.76; bad or very bad OR 0.52), making a simple risk-pooling explanation less plausible and pointing instead toward income-constrained exit as the primary mechanism.

Table 3. Determinants of private health insurance ownership: survey-weighted logistic models

Variable	Baseline Odds ratio	Extended Odds ratio
SURVEY YEAR (ref: 2005)		
2014	2.38***	2.17***
2019	3.41***	3.09***
SEX (ref: female)		
Male	1.10*	1.09†
AGE GROUP (ref: 15–24)		
25–34	1.28**	1.28**
35–44	1.66***	1.67***
45–54	1.39***	1.46***
55–64	1.01	1.09
65–74	0.61***	0.71**
75–84	0.35***	0.42***
85+	0.27***	0.34***
EDUCATION (ref: low education)		
Lower secondary	2.02***	1.93***
Upper secondary/post-secondary	2.62***	2.43***
Tertiary	2.74***	2.47***
INCOME GROUP (ref: G1)		
G2	1.48***	1.47***
G3	2.09***	1.99***
G4 (Highest)	4.19***	3.97***
SELF-ASSESSED HEALTH (ref: good/very good)		
Fair	—	0.76***
Bad or very bad	—	0.52***
Observations	67,184	56,137

Odds ratios from survey-weighted logistic regressions (quasibinomial), all three survey years. Income groups G1–G4. Significance: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Standard errors in replication files.

absolute probability gap between income groups is the key quantity for assessing whether

Appendix shows that the main results are robust to alternative link functions, linear probability models, a 2014–2019 restricted sample, and the original five-group income specification.

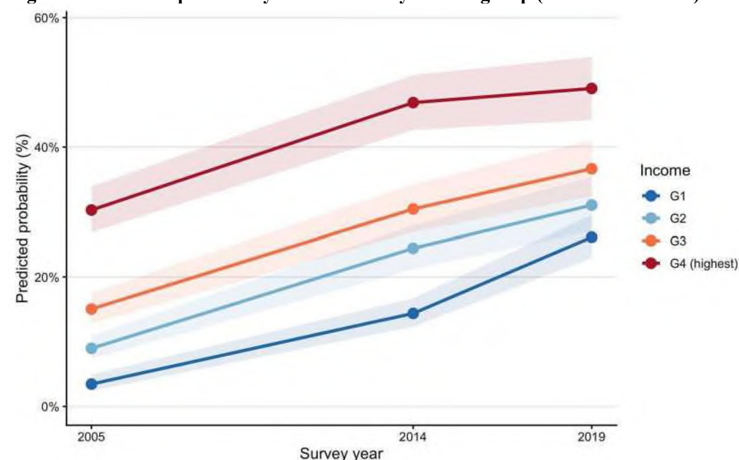
4.2 Differential Gap Analysis, Strategy 1

Table 4 reports predicted probabilities from the year-by-income and year-by-education interaction models, evaluated at reference covariate values (female, age 35–44, lower secondary education for the income model; G2 for the education model). The

the socioeconomic differential widened during austerity.

The income interaction model shows a clear pattern in the income gap over time. The gap between G4 and G1 widened from 26.8 percentage points in 2005 to 32.5 points in 2014, then narrowed to 22.9 points in 2019. This is consistent with the exit option hypothesis: the income differential in private insurance ownership grew during the austerity shock and partially unwound as the SNS recovered. The joint F-test for the year- by-income interactions is significant. Among G4 individuals, the predicted probability rose by 16.6 percentage points between 2005 and 2014, but by only 2.1 points between 2014 and 2019. Among G1 individuals the increase was more even: 10.9 points during austerity and 11.7 points during recovery. These trajectories are illustrated in Figure 2.

Figure 2. Predicted probability of insurance by income group (interaction model)



Predicted probability of private health insurance ownership by income group and survey year. Estimates from the survey-weighted logistic model with year-by-income interactions, evaluated at reference values (female, age 35-44, lower secondary education). Shaded bands are 95% confidence intervals.

Table 4 shows that the education gap, by contrast, is stable. The absolute probability difference between tertiary-educated and low-educated individuals is approximately 15 percentage points in each year after conditioning on income and other characteristics. The widening seen in raw descriptive data is accounted for by rising educational attainment in the population rather than by a change in the education-specific propensity to insure.

Table 4. Differential analysis: predicted probabilities from interaction models

	2005	2014	2019
Income interaction model			
G1	3.5	14.4	26.1
G2	9.0	24.4	31.0
G3	15.0	30.4	36.7
G4	30.3	46.9	49.0
Differential analysis: 64 — 61 (pp)	26.8	32.5	22.9
Education interaction model			
Low education	5.1	13.9	20.1
Lower secondary	9.3	24.3	32.8
Upper secondary/post-secondary	14.7	29.1	36.5
Tertiary	20.0	28.7	34.9
Differential analysis: Tertiary — Low education (pp)	14.9	14.8	14.8

Test	Statistic	p-value
Joint test: year x income group	F = 12.28	p < 0.001
Joint test: year x education group	F = 7.63	p < 0.001
Wald contrast: G4 interaction, 2019 vs 2014	Z = -5.17	p < 0.001

Predicted probabilities from survey-weighted logistic regressions with year-by-income (top-half) and year- by-education (bottom-half) interactions. Reference covariate values: female, age 35–44, lower secondary education (top); female, age 35–44, G2 income. Differential analyses show the absolute percentage-point difference between the highest and reference groups. 95% confidence intervals available in replication files.

4.1 Triple Difference, Strategy 2

Table 5 reports predicted probabilities from the three-way interaction model between income group, self-assessed health, and survey year. It focuses on the theoretically relevant income–health profiles, comparing G1 and G4 individuals in good versus bad self-assessed health across survey years. The income gap within each health stratum, the difference in predicted probability between G4 and G1, is the central test of whether the exit option mechanism operated differentially by health need.

Within the good-health group, the income gap widened from 30.1 percentage points in 2005 to 30.5 points in 2014. Within the bad-health group, the gap widened from 15.3 to 25.3 points, an increase of 10.0 percentage points, compared with 0.5 points for the

good-health group. This differential widening is consistent with the exit option hypothesis: high-income individuals with poor health face SNS queues through illness and have the means to exit. Among G4 individuals, private insurance grew by 14.8 percentage points between 2005 and 2014for those with bad health, compared with 11.1 points for those with good health.

The 2014-to-2019 changes are consistent with exit hysteresis: among G4 individuals, growth decelerated sharply in the recovery period for both health groups (+5.0 points for good health, +1.5 points for bad health). The predicted probabilities are directionally consistent with the exit option mechanism, but the joint three-way interaction is not statistically significant. The triple-difference evidence should therefore be interpreted as suggestive rather than decisive. Income is the primary driver regardless of health status, a finding that strengthens the welfare concern that exit is capacity-constrained rather than demand-driven.

Table 5. Triple difference: predicted probabilities by income group, health status, and survey year (%)

	2005	2014	2019
Good/very good selfassessed health			
G1	4.1	14.8	25.3
G4 (highest income)	34.2	45.3	50.3
Income gap: G4 minus G1 (pp)	**30.1**	**30.5**	**25.0**
Change in gap (pp)		**+0.5**	**-5.5**
Bad/very bad self-assessed health			
G1	**0.9**	5.6	19.2
G4 (highest income)	16.2	30.9	32.4
Income gap: G4 minus G1 (pp)	**153**	**25.3**	**13.2**
Change in gap (pp)		**+10.0**	**-12.0**
G4 absolute change (pp)			
Good/very good health		+11.1	+5.0
Bad/very bad health		+14.8	+1.5
Test		**Statistic**	**p-value**
Joint test: year x income group x health group		F - 0.83	p -0.615
Joint test: year x income group		F = 4.65	p <0.001
Joint test: year x health		F - 1.80	p - 0.126
Joint test: year x income group x good health		F - 4.82	p <0.001
Joint test: year x income group x bad health		F = 2.61	p = 0.016

*Predicted probabilities from the three-way interaction logit model (income group * self-assessed health * survey year), evaluated at reference covariate values: female, age 45-54, lower secondary education. The joint F-testfor the three-way interaction is not significant at the 5% level. The bad-health G1 estimate in 2005 is based on very few observations and should be interpreted with caution. Full model estimates in replication files.*

4.2 Oaxaca-Blinder Decomposition, Strategy 3

Table 6 reports the Oaxaca-Blinder decomposition for both periods. The 2005-to-2014 change in the weighted share of private insurance holders was 9.8 percentage points. Of this, 1.1 points (10.8 percent) is attributable to compositional change and 8.7 points (89.2 percent) to structural change: individuals in a given socioeconomic position became substantially more likely to hold private insurance regardless of demographic shifts. The 2014-to-2019 change was 5.6 percentage points, with structure again dominant at 5.3 points (93.9 percent).

The variable-level breakdown reveals a theoretically important sign reversal in the

income structural component. Between 2005 and 2014, the structural contribution of G2, G3, and G4 combined was +4.5 percentage points: higher-income individuals became more inclined to hold private insurance above and beyond what their characteristics predicted. Between 2014 and 2019, this income-specific structural component reversed to -2.2 percentage points. This sign reversal is consistent with the exit option mechanism: austerity raised the value of private insurance as an alternative to a deteriorating public system, and partial SNS recovery reduced it.

The education structural component follows a different trajectory. Education contributes negatively to structural change in the austerity period (-0.3 pp) but positively in the recovery period (+1.5 pp). Better-educated individuals continued adopting private insurance between 2014 and 2019 even as the income-specific propensity receded, suggesting a coexisting preference or sophistication effect that persists independently of SNS quality. Part of this pattern may reflect occupational subsystem coverage, such as ADSE, which is more common among educated public-sector employees. However, the strict voluntary analysis shows that the core socioeconomic pattern remains even when subsystem coverage is excluded.

Table 6. Oaxaca-Blinder decomposition of the change in private insurance ownership

	2005 to 2014 (austerity)	2014 to 2019 (recovery)
Total change (pp)	9.8	5.6
Composition effect (pp)	1.1	0.3
of which: education	0.8	0.3
of which: G2-G4	-0.3	0.0
of which: age and sex	0.6	0.0
Structure effect (pp)	8.7	5.3
of which: G2-G4	+4.5	-2.2
of which: education	-0.3	+ 1.5
of which: intercept/baseline	+7.1	+9.9
Structure share (%)	89.2	93.9
Composition share (%)	10.8	6.1

Two-way Blinder-Oaxaca decomposition using survey-weighted linear probability models estimated separately for each period, with the earlier survey as reference. Education sub-component sums tertiary, upper secondary/post-secondary, and lower secondary contributions. Income sub-component sums Groups 2, 3, and 4 contributions. The intercept/baseline row captures the structural shift in the baseline probability. Full variable-level detail in replication fdes.

4.3 Robustness: Voluntary versus All Private Insurance

The dependent variable in the main analysis captures all reported health insurance, including occupational subsystems such as ADSE which covers public-sector employees and their families. ADSE membership is not a voluntary market transaction: it is tied to public employment and does not reflect a deliberate exit from the SNS. Because ADSE is concentrated among educated, mid-to-high income public employees, it could artificially inflate the estimated associations between private insurance and both income and education. This section tests whether the main findings survive exclusion of subsystem holders.

The 2014 and 2019 surveys allow identification of subsystem membership, enabling two alternative outcome definitions: (i) all reported insurance including subsystems, which is the main specification (and identical to the 2014-2019 restricted model); and (ii) a strict voluntary definition that excludes respondents whose only reported coverage comes from an occupational subsystem. The 2005 survey does not permit this distinction,

so the voluntary analysis is restricted to 2014 and 2019. The main findings from the restricted model serve as the benchmark for comparison.

Appendix Table A5 reports insurance rates using the two alternative definitions of private insurance and breaks them down by income group. Two findings stand out. First, subsystem coverage is essentially flat between 2014 and 2019 (17.5 percent and 17.4 percent, respectively), confirming that the growth in overall insurance over this period is driven entirely by voluntary private uptake, not subsystem expansion. Second, subsystem coverage is heavily concentrated at the top of the income distribution: among quintile 5 individuals, 40.9 percent held subsystem coverage in 2014 and 36.6 percent in 2019, while G1 is barely affected (5.5 percent in 2014, 8.8 percent in 2019). The key income associations are therefore not an artifact of occupational subsystem coverage.

Table 7 compares the 2014-2019 all-insurance specification with the strict voluntary specification. The income associations are remarkably stable. G2 is almost unaffected (OR 1.526 versus 1.530). G3 falls modestly (1.924 versus 2.060). G4 falls more substantially (3.183 versus 3.952), reflecting the high concentration of ADSE among top-income individuals. Crucially, even after excluding subsystem holders, the odds ratio for G4 remains 3.18, nearly three times that of Gl. The income concentration of private insurance is not an ADSE artifact.

The education associations are more sensitive to the outcome definition. The tertiary education coefficient falls from OR 2.40 to OR 1.72 under the strict voluntary definition, a reduction of 0.68, while the G4 coefficient falls by 0.77. This asymmetry reflects the occupational structure of ADSE: public-sector

employment, which confers ADSE eligibility, is disproportionately concentrated among tertiary-educated individuals in health, education, and public administration. Excluding subsystem holders therefore removes a large part of the educated insurance-holder population while leaving the top income group less affected, since high-income private-sector workers hold voluntary insurance independently of subsystem membership.

The Oaxaca decomposition under the strict voluntary definition reinforces the main findings. The total change between 2014 and 2019 is 5.60 percentage points under the strict voluntary definition, almost identical to the 5.63 percentage points estimated using the main outcome. The structure component accounts for slightly more than the full change, at 100.9 percent, implying a very small negative composition component of around -0.05 percentage points. In substantive terms, this means that the increase in voluntary private insurance is not explained by changes in the observable demographic, education, or income composition of the population. Instead, it reflects a shift in the conditional propensity to hold private coverage. This supports the interpretation that the post-2014 increase is not driven by subsystem expansion or by compositional change, but by behavioral change within socioeconomic groups.

Table 7. Regression comparison: main model versus strict voluntary deflnition (2014-2019)

Variable	Main model (all insurance) Odds ratio	Strict voluntary Odds ratio	Difference
SURVEY YEAR			
2019 vs 2014	1.430	1.513	+0.083
EDUCATION (ref: low education)			
Lower secondary	1.959	1.709	-0.250
Upper secondary/post-secondary	2.413	2.079	-0.334
Tertiary	2.400	1.720	-0.680
INCOME GROUP (ref: Gil			
G2	1.530	1.526	-0.004
G3	2.060	1.924	-0.136
G4	3.952	3.183	-0.769
OAXACA: 2014^2019			
Total change (pp)	5.63	5.60	
Structure share (%)	93.9%	100.9%	
Test		**Statistic**	**p-value**
Joint test: all insurance		F = 8.92	p <0.001
Joint test: Strict voluntary insurance		F =5.36	p <0.001

*Main model is the survey-weighted logistic regression restricted to 2014 and 2019 with all reported insurance as the outcome (identical to results in Table 3 for 2014-2019 comparison). Strict voluntary excludes respondents identified as occupational subsystem (ADSE) holders. Both models include sex, age group, education, and income group as controls; age coefficients are notshownfor brevity. Oaxaca rows report the Blinder-Oaxaca decomposition of the 2014-to-2019 change, with structure share exceeding 100% indicating a small negative composition effect under the strict definition. Significance: ***p<0.001. All reported income and education coefficients are statistically significant atp<0.001 in both models.*

5. DISCUSSION

The results speak to three questions. What does the pattern of changes reveal about the mechanism driving private insurance expansion? What does the persistence of structural change across both periods tell us about how exit behavior evolves once it takes hold? And what does the evidence imply for universal health systems that must accommodate private coverage without deepening inequality of access?

5.1 What Drives the Expansion: Income, Not Education

Income is the primary driver of the expansion, with education playing a largely

compositional role. The probability gap between the highest and middle income groups widened during the austerity period and partially closed during recovery, consistent with income-constrained exit from SNS queuing. This pattern replicates for Portugal the central result of Besley, Hall, and Preston (1999), who show for England that SNS waiting lists directly raise private insurance demand, and extends it in two ways. First, we show that the mechanism applies in a different institutional setting and a different decade. Second, and more importantly, we show that the behavioral response to SNS degradation is itself socially stratified: the income gap widened during austerity rather than shifting upward uniformly, a pattern Besley, Hall, and Preston (1999) do not test. Propper (2000) confirms for the UK that income is the strongest individual predictor of private health care use, with the structural income association robust to controls for health status; our Oaxaca-Blinder decomposition shows the same structural relationship accounts for 89 percent of the 2005-2014 expansion in Portugal. Costa and Garcia (2003) confirm that the perceived quality gap between public and private provision is itself a driver of demand: when public-sector quality falls, private insurance uptake rises independently of changes in individual health risk.

The finding that education operates primarily through its correlation with income, not through independent mechanisms such as health literacy or market sophistication, is consistent with van Doorslaer and Wagstaff (1992), who show in a twelve-country comparison that income-related inequality in health care utilization dominates education effects once income is controlled. In our data, the conditional education gap is approximately 15 percentage points in each survey year; the widening raw education gap in the descriptive data reflects rising educational attainment, not a change in the education-specific propensity to insure. Policies targeting education as a lever for reducing inequality in private insurance access are therefore unlikely to succeed if the underlying income constraints remain unchanged. The

dominance of income over other predictors is also consistent with Blundell, Borella, Commault, and De Nardi (2024), who show that income and wealth are the primary buffers against health and consumption risk over the lifecycle.

The negative association between health need and private insurance ownership, net of income, is inconsistent with the adverse selection model of Rothschild and Stiglitz (1976). Under adverse selection, sicker individuals insure more; the Portuguese data show the opposite. This result is instead consistent with the preference-based and income-based selection framework developed in Einav and Finkelstein (2011), who show that selection in insurance markets is shaped by heterogeneity in preferences and resources rather than by risk alone. Our tripledifference result adds a dimension that the standard advantageous selection story does not predict: the income gap widened more for the bad-health group during austerity (10.0 percentage points) than for the healthy (0.5 points). Pure advantageous selection generates a uniform income gap independent of health status and independent of SNS quality; the exit option mechanism generates exactly the austerity-period differential we observe, because high-need individuals have the largest incentive to exit SNS queues but only high-income individuals can afford to act on that incentive.

5.2 Hysteresis and the Persistence of Structural Change

The Oaxaca-Blinder decomposition attributes roughly 89 percent of the 2005-to-2014 expansion and 94 percent of the 2014-to-2019 expansion to structural change, i.e. a shift in the conditional propensity to insure given observed characteristics. A simple exit-option model would predict structural change to be high during austerity and fall during recovery, as the incentive to exit weakens. The data show structural change remained dominant throughout, pointing to hysteresis. Handel (2013) provides direct evidence that inertia in health insurance markets is quantitatively large: employees maintain their existing plan even when switching would improve welfare, and reducing this

inertia can worsen adverse selection. In the Portuguese context, the parallel is that individuals who purchased private insurance during the austerity shock retained it during the recovery, converting a temporary demand shock into a permanent structural shift.

Two complementary mechanisms explain this persistence. The first is rational inertia: private insurance is typically renewed automatically, and the transaction costs of cancelling a policy and re-evaluating the public alternative are non-trivial. Once an individual has established a relationship with a private provider and experienced shorter waiting times, the status quo changes, and not renewing becomes the active decision. The second is the Hirschman (1970) feedback. Costa-Font and Jofre-Bonet (2008) provide direct evidence that private insurance uptake in the UK reduces stated preferences for SNS spending, consistent with high-SES exit weakening the political coalition for public provision. Jame and John (2021) tests the Hirschman model on publicly funded health services and finds that provider responsiveness to complaints reduces exit intentions, suggesting that quality improvements within the SNS can interrupt this

feedback loop. The Portuguese case extends that cross-sectional finding to a dynamic context: the austerity shock appears to have triggered a durable shift in the public-private balance, with structural change persisting well into the recovery period. If the Hirschman channel is active, the social cost of the austerity program extends beyond the immediate deterioration in SNS quality to include a persistent weakening of the political constituency for universal provision, an externality that is not priced into private insurance premiums and will not be corrected by an unregulated market.

5.3 Implications for SNS Design: The Case for Managed Complementarity

In universal systems where access is rationed partly through waiting time, private coverage may provide a valuable response to public-sector capacity constraints. Demand for private insurance is therefore endogenous to the quality of the public alternative: when

SNS waiting times rise, the value of exit increases; when timely access improves, the private exit premium should fall. This is consistent with the UK evidence in Besley, Hall, and Preston (1999) and Propper (2000), who show that NHS waiting times affect private insurance demand and with more recent evidence that private insurance may reduce public hospital waiting times only modestly (Yang, et al., 2024). The Portuguese evidence extends this mechanism by showing that the response to public-sector degradation is socially stratified. The relevant policy question is therefore not whether private insurance should coexist with universal public coverage, but under what institutional conditions such coexistence preserves equity rather than deepening stratification.

The Portuguese evidence suggests that unmanaged coexistence is unlikely to be distributionally neutral. Private insurance expanded most strongly among the groups with the greatest ability to purchase exit, and the income gradient widened during the period in which SNS constraints were most severe. This pattern is not simply a matter of heterogeneous preferences for private care. It reflects a structural feature of supplementary insurance in a rationed universal system: when the public sector is capacity constrained, private coverage becomes a positional good that converts income into faster access. This interpretation is consistent with van Doorslaer and Wagstaff (1992), who show that income- related inequality in health care access is closely linked to the institutional design of health financing and delivery, and with evidence that socioeconomic status is associated with unequal waiting times for health services (Landi, et al., 2018). The result is a formally universal system in which entitlement remains equal, but timely access becomes increasingly differentiated by socioeconomic status.

This has two implications for policy design. First, maintaining SNS capacity is itself a central instrument for managing exit-option demand. Reducing waiting times within the SNS is not only a public-sector performance objective; it is also a way of limiting the inequality premium attached to private coverage, especially because hospital queues can

generate broader health and labour-supply costs (Godoy, et al., 2024). Second, where supplementary coverage exists, its design matters. Private insurance should be regulated so that it complements rather than segments the universal system. This implies attention to benefit design, risk selection, and the allocation of complex or costly cases between sectors. Without such rules, the private tier may attract lower-risk and higher- income users while leaving the SNS with a more concentrated burden of complex
care, a concern consistent with Rothschild and Stiglitz (1976) on adverse selection and with the welfare losses from unmanaged plan sorting documented by Cutler and Reber (1998). Chen, Feng, and Gu (2025) show in a lifecycle model that universal health coverage narrows health and life expectancy gaps, reinforcing the equity case for maintaining strong public provision as the floor of a complementary system. The Portuguese evidence provides the empirical motivation.

The broader contribution of the Portuguese case is to shift the policy debate from the binary question of public versus private provision to the institutional design of their interaction. Recent evidence on public options similarly shows that public-private coexistence can generate segmentation across users and providers rather than neutral competition (Atal, et al., 2024). Universal systems do not necessarily become less universal when private insurance expands, but they can become more layered. The central policy challenge is therefore to prevent supplementary coverage from transforming universal entitlement into unequal effective access. Managed complementarity denotes this middle ground: private or supplementary provision may expand choice and relieve capacity constraints, but only if it is embedded in rules that protect the public floor, limit cream-skimming, and prevent timely care from becoming increasingly dependent on income. This logic is consistent with Le Grand’s (2007) argument that choice can support equity only when institutional design aligns incentives with public objectives, and with Enthoven’s (1985) managed-competition framework, in which regulated competition is used to

discipline provision without abandoning universalism.

6. CONCLUSION

This paper documents the expansion of voluntary private health insurance in Portugal between 2005 and 2019 and shows that it is driven by exit-option demand rather than risk pooling. Three findings support this interpretation. First, the expansion is overwhelmingly behavioral, roughly 89 percent of the 2005-2014 growth is attributed by the Oaxaca-Blinder decomposition to a shift in the conditional propensity to insure, not to demographic change; this share rises to 94 percent during recovery. Second, the income gap in coverage widened during the austerity shock and was largest among high-income individuals with poor health, i.e. those who need care and can afford to bypass SNS queues, extending the findings of Besley, Hall, and Preston (1999) and Propper (2000) for the UK to a dynamic, post-austerity setting. Third, private insurance concentrates among the wealthy and the healthy, not the sick, inconsistent with risk pooling and consistent with premium-constrained exit: those with the greatest need and the lowest income cannot afford the product that would alleviate their waiting-time burden. These results characterize the Portuguese SNS as formally universal but practically layered, and add individual-level microeconomic evidence to the political economy literature on exit, voice, and public-service quality initiated by Hirschman (1970) and extended empirically by Costa-Font and Jofre-Bonet (2008).

The policy implication is not that private insurance should be suppressed. In a universal system with capacity constraints, demand for private coverage partly reflects the quality, accessibility, and waiting times of the public alternative. The relevant policy question is therefore how to govern the interaction between public

and private provision. Maintaining SNS capacity is central: when waiting times rise, private insurance becomes more valuable as an exit option, especially for higher-income

groups. Conversely, improving timely access within the SNS should reduce the socioeconomic premium attached to private coverage. At the same time, the evidence suggests that unregulated coexistence can deepen stratification. Complementary coverage may therefore require rules that limit cream-skimming, preserve risk-sharing, and prevent the private tier from shifting complex or costly cases back onto the SNS. More broadly, the Portuguese case points toward managed complementarity: a system in which private or supplementary provision can expand choice without weakening the universal public floor or making timely access increasingly dependent on income.

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APPENDIX ROBUSTNESS CHECKS

Tables A1 through A5 replicate the main findings under alternative specifications and outcome definitions. Tables 1 and 2 report probit and linear probability models, respectively. Table A3 restricts the analysis to the 2014 and 2019 surveys. Table A4 reports the original five-group income specification, and Table A5 compares the main all-insurance outcome with the strict voluntary definition available for 2014 and 2019.

Table A1. Robustness: survey-weighted probit models

Variable	Probit baseline	Probit extended
SURVEY YEAR (ref: 2005)		
2014	0.494*** (0.028)	0.447*** (0.031)
2019	0.707*** (0.030)	0.657*** (0.033)
SEX		
Male	0.057* (0.023)	0.047† (0.025)
AGE GROUP		
25–34	0.149** (0.046)	0.147** (0.051)
35–44	0.299*** (0.043)	0.302*** (0.047)
45–54	0.197*** (0.045)	0.225*** (0.050)
55–64	0.015 (0.048)	0.060 (0.053)
65–74	-0.254*** (0.054)	-0.167** (0.059)
75–84	-0.542*** (0.064)	-0.437*** (0.070)
85+	-0.686*** (0.128)	-0.572*** (0.133)
EDUCATION		
Lower secondary	0.370*** (0.036)	0.351*** (0.037)
Upper secondary/post-sec.	0.526*** (0.036)	0.489*** (0.038)
Tertiary	0.565*** (0.039)	0.509*** (0.042)
INCOME GROUP (ref: G1)		
G2	0.220*** (0.035)	0.212*** (0.036)
G3	0.417*** (0.034)	0.390*** (0.036)
G4	0.825*** (0.037)	0.798*** (0.039)
SELF-ASSESSED HEALTH		
Fair	—	-0.159*** (0.029)
Bad or very bad	—	-0.334*** (0.050)
Observations	67,184	56,137

Probit coefficients with standard errors in parentheses. Significance: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table A2. Robustness: survey-weighted linear probability models

Variable	LPM baseline	LPM extended
SURVEY YEAR (ref: 2005)		
2014	0.093*** (0.006)	0.079*** (0.006)
2019	0.144*** (0.007)	0.130*** (0.007)
SEX		
Male	0.013* (0.005)	0.011† (0.006)
AGE GROUP		
25–34	0.042*** (0.012)	0.043** (0.014)
35–44	0.091*** (0.011)	0.092*** (0.013)
45–54	0.058*** (0.012)	0.065*** (0.014)
55–64	0.018 (0.011)	0.027* (0.014)
65–74	-0.023* (0.011)	-0.008 (0.013)
75–84	-0.046*** (0.011)	-0.030* (0.013)
85+	-0.065*** (0.014)	-0.047** (0.016)
EDUCATION		
Lower secondary	0.068*** (0.008)	0.067*** (0.009)
Upper secondary/post-sec.	0.125*** (0.009)	0.121*** (0.010)
Tertiary	0.156*** (0.011)	0.145*** (0.012)
INCOME GROUP (ref: G1)		
G2	0.036*** (0.006)	0.035*** (0.007)
G3	0.076*** (0.007)	0.073*** (0.008)
G4	0.201*** (0.010)	0.205*** (0.011)
SELF-ASSESSED HEALTH		
Fair	—	-0.045*** (0.007)
Bad or very bad	—	-0.048*** (0.008)
Observations	67,184	56,137

OLS coefficients interpretable as percentage-point differences. Significance: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table A3. Robustness: restricted to 2014 and 2019 surveys

Variable	Coefficient (SE)	Odds ratio
SURVEY YEAR (ref: 2014)		
2019	0.358*** (0.048)	1.43
SEX		
Male	0.065 (0.049)	1.07
AGE GROUP		
25–34	0.189† (0.100)	1.21
35–44	0.411*** (0.091)	1.51
45–54	0.223* (0.096)	1.25
55–64	-0.094 (0.100)	0.91
65–74	-0.542*** (0.112)	0.58
75–84	-1.139*** (0.139)	0.32
85+	-1.324*** (0.288)	0.27
EDUCATION		
Lower secondary	0.672*** (0.076)	1.96
Upper secondary/post-sec.	0.881*** (0.076)	2.41
Tertiary	0.875*** (0.084)	2.40
INCOME GROUP (ref: G1)		
G2	0.425*** (0.073)	1.53
G3	0.723*** (0.071)	2.06
G4	1.374*** (0.076)	3.95
Observations	32,677	

Survey-weighted logistic regression restricted to 2014 and 2019. Reference year: 2014. Significance: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table A4. Robustness: original five-group income specification

Variable	Coefficient (SE)	Odds ratio
SURVEY YEAR (ref: 2005)		
2014	0.865*** (0.052)	2.38
2019	1.222*** (0.055)	3.39
SEX		
Male	0.099* (0.042)	1.11
EDUCATION		
Lower secondary	0.700*** (0.066)	2.01
Upper secondary/post-sec.	0.963*** (0.065)	2.62
Tertiary	1.011*** (0.070)	2.75
INCOME GROUP (ref: group 1)		
Quintile 2	-0.077 (0.093)	0.93
G2	0.356*** (0.084)	1.43
G3	0.697*** (0.082)	2.01
G4	1.394*** (0.085)	4.03
Observations	67,184	

Survey-weighted logistic regression, all three survey years. Group 1 reference. Age group coefficients omitted for brevity. Significance: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table A4 reports the main model with the original five income groups and group 1 as the reference category. The non-significant coefficient for group 2 relative to group 1 (OR 0.93, p = 0.41) illustrates the comparability problem motivating the G1 in the main analysis: the two lowest income bands in 2005 do not represent meaningfully distinct positions once harmonized with 2014 and 2019. G2, G3, and G4 are unaffected and replicate the main findings.

5. Strict Voluntary Insurance Definition, 2014–2019

Table A5 compares three outcome definitions for 2014 and 2019: all reported insurance, strict voluntary insurance, and subsystem coverage. The purpose is to assess whether the increase in private insurance ownership between 2014 and 2019 is driven by voluntary private uptake or by occupational subsystem coverage. Subsystem coverage is essentially unchanged over the period, while strict voluntary insurance rises in every income group.

Table A5. Private insurance rates by outcome definition and income group (%)

Income group	All insurance 2014	Strict voluntary 2014	Subsystem only 2014	All insurance 2019	Strict voluntary 2019	Subsystem only 2019
G1	8.0	7.4	5.5	16.3	14.8	8.8
G2	16.3	14.6	12.3	20.4	18.9	11.8
G3	23.5	20.1	23.2	29.3	25.3	20.9
G4 (highest)	42.7	31.6	40.9	44.5	35.2	36.6
Overall	19.7	16.2	17.5	25.3	21.8	17.4

Weighted percentage of respondents in each category reporting the indicated type of coverage. "All insurance" is the main outcome variable (IN6 = 1). "Strict voluntary" excludes respondents whose coverage is identified as an occupational subsystem (ADSE or equivalent). "Subsystem only" indicates subsystem membership regardless of voluntary coverage. Analysis restricted to 2014 and 2019 because the 2005 survey does not permit distinction by insurance type. Survey-weighted estimates.