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# Private health insurance in the universal public healthcare system: The role of healthcare provision in Finland

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## ABSTRACT

Voluntary private health insurance (VPHI) has gained popularity in universal public healthcare systems. We studied how the local provision of healthcare services correlated with VPHI take-up in Finland. Nationwide register data from a Finnish insurance company was aggregated to the local level and augmented with high-quality data on public and private primary care providers' geographical closeness and fees. We found that the sociodemographic characteristics explained the VPHI take-up more than public or private healthcare provision. The VPHI take-up was negatively associated with distance to the nearest private clinic, while the associations with distance to public health stations were statistically weak. Fees and co-payments for healthcare services were not associated with insurance take-up, meaning that the geographical closeness of providers explained the take-up more than the price of services. On the other hand, we found that VPHI take-up was higher when local employment, income and education levels were higher.

## 1. Introduction

Increasingly more people have enrolled in voluntary private health insurance (VPHI) plans in Nordic countries during the last decade [1]. Although Nordic healthcare systems guarantee universal access to public healthcare, people purchase VPHIs to cover the costs of private healthcare services [1]. In addition to private healthcare coverage, VPHI in Finland and Denmark typically covers public healthcare co-payments and medicine costs [1].

There are many explanations for the VPHI take-up in systems with universal public healthcare. Tynkkynen et al. [1] found several institutional and cultural factors that have contributed to VPHI take-up in Nordic countries. In particular, specialised care in public healthcare requires a general practitioner's (GP) referral, but VPHI allows direct access to a specialist in a private clinic. Research has found that the take-up of private health insurance in countries with public healthcare systems is associated with, for example, various sociodemographic characteristics [2], risk attitudes [3] and dissatisfaction with the public healthcare system [4]. Also, private health insurance is negatively associated with using public healthcare services [5,6] but positively with using healthcare services in general [7–9]. However, less is known about the relationship between private health insurance take-up and the provision of healthcare services. Literature on healthcare provision has focused on waiting times/lists [10,11] and different capacity- or

spending-related measures [12,13].

We contribute to the literature in five ways. First, we study how geographical closeness, outsourcing and fees for healthcare services are associated with VPHI take-up. This is made possible by collecting novel data on all public and private primary care providers in the country. Second, whereas many existing papers are based on survey data, we employ nationwide register data to identify VPHI take-up. Third, we study how sociodemographic characteristics are related to VPHI take-up when healthcare provision is taken into account. Fourth, we differentiate between adults and children as well as between policies with different coverages. Fifth, we expand the literature on VPHI markets in universal public healthcare systems. In the majority of European countries, including other Nordic countries and the UK, group policies are more common than self-purchased policies [14]. In Finland, self-purchased policies dominate the private health insurance market [1, 14].

Knowledge on the association between VPHI take-up and healthcare provision is important because it benefits policy-making. In particular, unintentional promotion of VPHIs may lead to an increase in inequality [15] or affect attitudes towards publicly-funded healthcare [16].

### 1.1. Finnish healthcare system

Finland has a three-tier primary healthcare system: care is provided

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through public, occupational and private healthcare [17]. In 2016–2018, public primary care was available for all residents and mainly provided in health stations [17]. Health stations are GP group practices with nurses and other professionals [17]. A wide health station network guarantees availability of primary care even in the remoter parts of the country and, since 2014, patients have been allowed to choose a health station according to their preferences [17]. Health stations charge adults relatively low patient fees and charge no fees for children, but long waiting times make these services seem less attractive [17,18]. Also, even low fees can create barriers of access for the less wealthy [19]. Some of the health stations were outsourced to private providers [17]. Improvement in service quality was among the intended outcomes of outsourcing [20], although the results are unknown.

In addition to public primary care, more than one-third of the population was entitled to occupational primary care services in 2016–2018 (see Appendix A). The provider of occupational services is employer-specific, but private clinics provide the majority of occupational healthcare [17,21]. Occupational primary care services are often superior to public services because occupational care is free of charge at the point of use and the waiting times are short [17,22]. Therefore, people who use occupational healthcare services do not typically use public primary care at all [23].

Private healthcare is the third way to seek primary care services. It is an alternative to public primary care for people who do not have access to occupational healthcare. Some working-age people also use private services in tandem with occupational healthcare [23]. Private services have minimal waiting times, but they are expensive in comparison to public and occupational care, even if the National Health Insurance (NHI) reimburses part of the cost [17]. The non-reimbursed part (hereafter, NHI co-payment) must be covered out of pocket or by VPHI reimbursement. Depending on the insurance policy, VPHI reimbursement may also require a co-payment (hereafter, VPHI co-payment). Due to the high expenses, the use of private healthcare services is skewed toward higher income groups [23,24], even if wealthier people are more likely to be employed and, thus, have access to occupational care.

## 1.2. VPHI market

The Finnish VPHI market is a result of institutional development (or inertia). The statutory NHI has reimbursed private healthcare costs since the early 1960s and has not been terminated despite the expansion of public and occupational healthcare systems since the 1970s [1,21]. The NHI reimbursement shares have, however, declined considerably over the years, thereby increasing the NHI co-payments [1,19]. In tandem with poor access to public primary care and people's increased habituation to private clinics, the increased NHI co-payments have caused a growth in VPHI demand in recent years [1]. From 2009–2019, the take-up of adults' illness insurance increased by 33% and children's by 18% (see Appendix B).

We concentrate on four types of products that are common in the Finnish VPHI market: illness insurance for adults, illness insurance for children, accident insurance for adults and accident insurance for children. Illness insurance covers expenses of healthcare services (including medicines) which result from an illness, while accident insurance covers expenses of healthcare services resulting from accidents during leisure time (work accidents are covered by statutory insurance) [25]. Many insurance companies bundle illness insurance with accident insurance so that the customer can purchase either accident insurance or a bundle of accident and illness insurances [25]. Price of illness insurance is multifold in comparison to accident insurance, likely reflecting the differences in expected healthcare service use between the policies. The more expensive illness insurance has been positively associated with income [18] and, hence, is more of a luxury good. VPHI policies do not restrict the choice of provider and, although typically intended to cover private healthcare expenses, they have both supplementary and complementary roles as they cover the costs of both public and private

healthcare services [1,25]. The majority of Finnish VPHIs are self-purchased [1,14].

## 2. Materials and methods

Our primary data source is a nationwide register on self-purchased accident and illness insurances of a major insurance company in Finland from 2016–2018. We aggregated the insurance data to postcode area level by counting the number of insured working-age adults (18–64 years old) and children (0–17 years old) and dividing the count by the Statistics Finland's statistics on the number of all working-age adults or children in the area. The resulting data was augmented with novel data on geographical closeness, outsourcing and fees of public [26,27] and private [28] primary care providers. In addition, we retrieved a rich set of sociodemographic characteristics from Statistics Finland. For alternative analyses, we retrieved measures of public healthcare expenditures and waiting times from the Finnish Institute for Health and Welfare. The sample was restricted by excluding postcode areas with less than 30 adults or 30 children (approximately 25% of observations) or with annual population increase or decrease exceeding 10% in any of the observation years (7%). The final sample has 2166 postcode areas and 6310 observations.

The data includes four measures of VPHI take-up. First, the share of working-age adults who had a VPHI with accident and illness coverage. Second, the share of working-age adults who had a VPHI with only accident coverage. Third, the share of children with a VPHI that had both accident and illness coverage and, fourth, the share of children with a VPHI that had only accident coverage. Since the final sample only includes insurance data as a means, our results do not reveal any information on the insured individuals.

We estimated the following specification to study associations of VPHI take-up:

$$y_{pt} = \beta_0 + \gamma \mathbf{R}_{pt} + \delta \mathbf{P}_{pt} + \theta \mathbf{X}_{pt} + \mathbf{T}_t + \varepsilon_{pt}, \quad (1)$$

where  $y_{pt}$  is one of the four outcomes that measured VPHI take-up in postcode area  $p$  and year  $t$ ,  $\mathbf{R}_{pt}$  is a set of measures on private primary care provision,  $\mathbf{P}_{pt}$  is a set of measures on public primary care provision and  $\mathbf{X}_{pt}$  is a set of controls regarding sociodemographic characteristics.  $\mathbf{X}_{pt}$  also includes the share of postcode area residents who were the study company's banking customers in order to take regional variation in VPHI market shares into account.  $\mathbf{T}_t$  are the time fixed effects which take into account, for example, national trends in the VPHI take-up. Standard errors are clustered at the municipality level because (i) public primary care was organised by municipalities and (ii) private clinics were often concentrated near the centres of municipalities. In order to prevent the large number of less populous postcode areas from dominating the more populous ones, each observation is weighted by the postcode area's share of the Finnish population. Appendix C describes the data and estimation method in more detail.

Table 1 displays descriptive statistics of VPHI take-up and the measures of public and primary care provision. Panel A shows that, in an average postcode area, 15% of the working-age adults had the study company's VPHI—11% with accident coverage and 4% with accident and illness coverage. On average, 10% of children were insured for accidents and 14% for accidents and illnesses.

Panel B shows that 20% of the postcode areas had the nearest private clinic within a 5–10-minute drive, 33% had the nearest clinic within a 10–20-minute drive and 39% had no private clinic within a 20-minute drive. The remaining 8% had a private clinic within a 5-minute drive. In an average postcode area, the mean NHI co-payment for a GP appointment was 54 euros and the mean NHI co-payment for a paediatrician appointment was 74 euros. Public health stations were geographically more accessible than private clinics: 13% of postcode areas had a health station within a 5-minute drive and only 12% had no health station within a 20-minute drive. The nearest health station was

**Table 1**  
Descriptive sample statistics.

	Mean	SD	Min	Max
<b>Panel A. VPHI take-up</b>				
Share of working-age adults with VPHI				
Only accident coverage	0.11	0.04	0.00	0.32
Accident & illness coverage	0.04	0.02	0.00	0.17
Share of children with VPHI				
Only accident coverage	0.10	0.07	0.00	0.61
Accident & illness coverage	0.14	0.07	0.00	0.60
<b>Panel B. Healthcare provision</b>				
Private primary care				
Nearest private clinic: 5–10 mins	0.20	0.40	0	1
Nearest private clinic: 10–20 mins	0.33	0.47	0	1
Nearest private clinic: >20 mins	0.39	0.49	0	1
NHI co-payment: GP (€10)	5.4	0.6	3.6	8.7
NHI co-payment: paediatrician (€10)	7.4	0.9	4.0	11.8
Public primary care				
Nearest health station: 5–10 mins	0.31	0.46	0	1
Nearest health station: 10–20 mins	0.44	0.50	0	1
Nearest health station: >20 mins	0.12	0.32	0	1
Nearest health station outsourced	0.10	0.30	0	1
Fee of three health station visits (€10)	5.2	1.4	0.0	6.3

Notes: Includes annual postcode-level observations from 2016 to 2018. N of observations = 6,310. N of postcode areas = 2,166. Children are defined as 0–17-year-olds. Working-age adults are defined as 18–64-year-olds. The NHI co-payment is the private healthcare cost for a person without a VPHI. Postcode areas with less than 30 working-age adults or 30 children were excluded (approximately 25% of the observations). N of private clinics in the whole country ≈ 325. N of health stations in the whole country ≈ 550.

outsourced to a private provider in 10% of the postcode area observations. The outsourced health stations are not equivalent to private clinics because the outsourcing contracts with fixed annual payments, incentive systems and sanctions promote cost-containment and gate-keeping [29]. The average fee of three health station visits was 52 euros. This level is moderate because by law the fees only apply to the first three non-emergency visits of the calendar year after which the rest of the non-emergency visits are free of charge [30].

Descriptive statistics of main control variables (see Appendix D) show that, in an average postcode area, 52% of adults were employed, the median household income was approximately 36,000 euros, 17% of adults had a university degree, 49% of residents were females and the mean household size was 2.2 persons. Some of the control variables are strongly correlated with each other. We ran robustness checks where we excluded the correlated variables.

Our analysis is representative of the entire VPHI market for three reasons. First, the study company was the market leader in VPHIs with approximately 40% market share. Second, the company was able to reach people in all areas and with all socioeconomic backgrounds due to the nationwide branch network and extensive customer base in financial services (approximately one third of the Finnish population, according to the study company's annual reports and Statistics Finland's population statistics). Third, bias from regional variation in VPHI market shares is mitigated by controlling for the share of postcode area residents who were the study company's banking customers. The representativeness is studied in detail in Appendix E.

### 3. Results

Table 2 depicts associations between VPHI take-up and healthcare provision. Estimates on geographical closeness of private clinics are negative and their magnitude grows with distance. Most of the estimates regarding the longest distances (>20 mins) are also statistically significant. Therefore, VPHI take-up was lower when private clinics were farther away. In comparison to areas where the nearest private clinic was within a 5-minute drive, the take-up of adult illness insurance was

**Table 2**  
Take-up of VPHIs in Finland between 2016–2018.

	Adults		Children	
	Accident <sup>a</sup> (1)	Illness <sup>b</sup> (2)	Accident <sup>a</sup> (3)	Illness <sup>b</sup> (4)
<b>Private provision</b>				
Nearest private clinic: 5–10 mins	-0.001 (0.001)	-0.001 (0.001)	-0.003 (0.002)	0.002 (0.003)
Nearest private clinic: 10–20 mins	-0.003 (0.002)	-0.002 (0.001)	-0.005 (0.003)	-0.003 (0.003)
Nearest private clinic: >20 mins	-0.006* (0.003)	-0.005*** (0.001)	-0.001 (0.004)	-0.012*** (0.003)
NHI co-payment: GP (€10)	-0.004** (0.002)	-0.002 (0.001)		
NHI co-payment: paediatrician (€10)			0.001 (0.002)	-0.001 (0.002)
<b>Public provision</b>				
Nearest health station: 5–10 mins	-0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.001 (0.002)
Nearest health station: 10–20 mins	0.002 (0.002)	0.001 (0.001)	0.004 (0.003)	-0.000 (0.003)
Nearest health station: >20 mins	0.008* (0.003)	0.002 (0.002)	0.005 (0.004)	0.003 (0.004)
Nearest health station outsourced	0.001 (0.002)	0.001 (0.001)	-0.002 (0.003)	0.002 (0.004)
Fee of three health station visits (€10)	-0.001 (0.001)	0.000 (0.000)		
N	6310	6310	6310	6310
R <sup>2</sup>	0.55	0.57	0.42	0.58
Mean(y <sub>pt</sub> )	0.11	0.04	0.08	0.14
F-test: private provision	2.96*	4.16**	1.07	5.34***
F-test: public provision	2.57*	0.60	0.78	0.36
Year fixed effects	✓	✓	✓	✓
Age and sex	✓	✓	✓	✓
Income, employment and education	✓	✓	✓	✓
Mean household size	✓	✓	✓	✓
Banking services control <sup>c</sup>	✓	✓	✓	✓

<sup>a</sup> Standard errors are clustered at the municipality level ( $N = 286$ ). \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Includes annual postcode-level observations from 2016 to 2018. Each observation is weighted by the postcode area's population share. Postcode areas with less than 30 working-age adults or 30 children excluded (approximately 25% of the observations). Share of adults/children who had VPHI with only accident coverage.

<sup>b</sup> Share of adults/children who had VPHI with accident and illness coverage.

<sup>c</sup> Share of postcode area residents who were the study company's banking customers.

0.5 percentage points (or 13% compared to the mean take-up) lower when the nearest clinic was not within a 20-minute drive. The magnitude of other statistically significant estimates concerning private healthcare closeness is 5–9% in comparison to the mean take-up. The private healthcare price was mainly not associated with VPHI take-up, even if the prices had considerable variation across areas (Table 1). The only exception was the adults' accident insurance which was (unintuitively) lower when private GPs had higher prices.

Estimates on health station closeness are positive, but only one of them is statistically significant. Therefore, geographical closeness of health stations was only associated with the adults' accident insurance. In comparison to areas with a health station within a 5-minute drive, areas without health stations within a 20-minute drive had 0.8 percentage points (or 7% compared to the mean take-up) lower adult accident insurance take-up. Patient fees and outsourcing of health stations

were not associated with the take-up.

Table 3 shows associations between VPHI take-up and alternative measures of healthcare provision. The take-up of illness insurance was higher in areas where a private clinic was closer than the health station or where choosing a private clinic over the health station caused less additional driving (panel A). If the differential driving time decreased by 10 minutes, adult illness insurance take-up was 0.1 percentage points higher (3% in comparison to mean take-up) and child illness insurance take-up was 0.4 percentage points higher (3%). Take-up of accident insurance was lower in areas with longer waiting times (panel B). The take-up of children's accident insurance was associated with public healthcare expenditures: better public resources were associated with lower take-up (panel C). An increase of 0.1 in the index value was associated with a 0.4 percentage point lower take-up of accident insurance, which corresponds to 5% in comparison to the mean take-up. Modifications to the estimation equation in panels A–C did not substantially alter the rest of the estimates when compared to the baseline results in Table 2.

Estimates of five sociodemographic area characteristics in Table 4 show that take-up of illness insurance was higher in areas with higher employment, income and education. Higher illness insurance take-up was also associated with smaller household size. The estimates' magnitudes are large. For example, a 10 percentage point increase in employment (19% increase from mean employment) was associated with a 16% increase from the mean take-up of adults' illness insurance and 19% increase from the mean take-up of children's illness insurance. The adults' accident insurance was associated with all of the main control variables except for employment, while children's accident insurance was mainly associated with education.

Most of the results are similar between adults and children. The only differences concern the accident insurance take-up: adults' take-up was associated with public and private provider closeness, private GP co-

**Table 3**  
Alternative measures of healthcare provision.

	Adults		Children	
	Accident <sup>a</sup> (1)	Illness <sup>b</sup> (2)	Accident <sup>a</sup> (3)	Illness <sup>b</sup> (4)
<b>Panel A: Differential driving time<sup>c</sup></b>				
Differential driving time (10 min)	0.001 (0.001)	0.001** (0.000)	-0.001 (0.001)	0.004** (0.001)
<b>Panel B: Waiting times in public primary care<sup>d</sup></b>				
>7 days (% of visits)	-0.033*** (0.009)	0.003 (0.005)	-0.054*** (0.016)	-0.009 (0.012)
<b>Panel C: Public healthcare spending<sup>e</sup></b>				
Index of need-adjusted expenditures	-0.026 (0.014)	0.007 (0.007)	-0.037** (0.014)	-0.012 (0.019)

<sup>a</sup> Standard errors are clustered at the municipality level ( $N = 286$ ). \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . N of observations = 6,310. Mean( $y_{pt}$ ) = (1) 0.11, (2) 0.04, (3) 0.08 and (4) 0.14. Share of adults/children who had VPHI with only accident coverage.

<sup>b</sup> Share of adults/children who had VPHI with accident and illness coverage.

<sup>c</sup> The six indicators of driving time replaced by one measure of differential driving time: driving time to the nearest health station minus driving time to the nearest private clinic (in tens of minutes). Mean = -0.71, SD = 1.24, min = -27.08, max = 3.59.

<sup>d</sup> Additional variable to the baseline estimation equation: share of elective outpatient visits in public primary care in which waiting time exceeded 7 days (situation in October in year  $t$ ). Calculated at the hospital district level (N of hospital districts = 20). Mean = 0.49, SD = 0.11, min = 0.20, max = 0.69.

<sup>e</sup> Additional variable to the baseline estimation equation: municipal index of need-adjusted expenditures of health and elderly care (whole country = 1). Mean = 1.01, SD = 0.08, min = 0.73, max = 1.45. The index value not available for one observation and, hence, N of observations = 6309.

**Table 4**  
Estimates of the main control variables.

	Adults		Children	
	Accident <sup>a</sup> (1)	Illness <sup>b</sup> (2)	Accident <sup>a</sup> (3)	Illness <sup>b</sup> (4)
Adults employed (%)	0.012 (0.037)	0.064*** (0.014)	-0.065 (0.044)	0.267*** (0.037)
Median household income (€10,000)	0.011** (0.003)	0.008*** (0.001)	-0.006 (0.004)	0.011** (0.003)
Adults with university degree (%)	0.093*** (0.017)	0.040*** (0.009)	0.092*** (0.024)	0.167*** (0.023)
Females (%)	0.228*** (0.058)	0.022 (0.022)	-0.038 (0.067)	-0.010 (0.071)
Mean household size	-0.037*** (0.010)	-0.019*** (0.005)	0.019 (0.013)	-0.041*** (0.011)
N	6310	6310	6310	6310
R <sup>2</sup>	0.55	0.57	0.42	0.58
Mean( $y_{pt}$ )	0.11	0.04	0.08	0.14
Healthcare provision	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Age	✓	✓	✓	✓
Banking services control <sup>c</sup>	✓	✓	✓	✓

<sup>a</sup> Standard errors clustered at the municipality level ( $N = 286$ ). \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Includes annual postcode-level observations from 2016 to 2018. Each observation is weighted by the postcode area's population share. Postcode areas with less than 30 adults or 30 children excluded (approximately 25% of the observations). Share of adults/children who had VPHI with only accident coverage.

<sup>b</sup> Share of adults/children who had VPHI with accident and illness coverage.

<sup>c</sup> Share of postcode area residents who were the study company's banking customers.

payment and various sociodemographics, but children's take-up was only associated with the share of adults with a university degree. In addition, there are differences between policies with different coverage. Public healthcare provision was associated with adults' accident insurance but not with adults' illness insurance. Differential waiting times were associated with illness rather than accident insurance, while the opposite was true for waiting times.

## 4. Discussion

### 4.1. Healthcare provision

Research in other countries has found some evidence on the relationship between private health insurance take-up and public healthcare provision. The take-up has been negatively associated with public healthcare expenditures [12,13,31–33], even though some evidence on neutral association has been found [10]. In our results, only one out of four estimates regarding public healthcare spending was negative and statistically significant, showing that spending was mostly not correlated with VPHI take-up in Finland. Similarly, most papers found a positive [10,13,31,34–37] or neutral [11,12,32] relationship between VPHI take-up and waiting times/lists. Our results show neutral and negative associations between VPHIs and waiting times. Although the result is similar to Valtonen et al. [18], the negative estimates are unintuitive and likely caused by unobserved factors that are correlated with both waiting times and VPHI take-up. Lastly, some papers have studied associations between VPHIs and public healthcare provision with capacity-related measures. The number of public healthcare beds or staff has not been found to be associated with VPHI take-up [10,13, 31], except by Propper et al. [12] who found that VPHI take-up was lower when there were more public healthcare beds. Our analysis did not include capacity-related measures, but our other evidence is similar in nature: the association between VPHI take-up and public healthcare provision was weak (accident insurance) or did not exist at all (illness

insurance).

There is less evidence regarding the association between private health insurance take-up and private healthcare provision. In the UK, the take-up has been positively associated with the number of private hospitals, private hospital beds and private hospital staff [12,13,33,35], although there is some evidence for lack of association [31]. Our paper provides supportive evidence from the Finnish institutional context. We introduced the geographical closeness and prices of private clinics to the analysis and found that the closeness was associated with VPHI take-up. Importantly, our results are likely to underestimate the association. NHI reimburses patients' travel costs to private clinics, but the reimbursement is based on the cost of travelling to the nearest available clinic using the cheapest mode of transport [17]. Also, the NHI travel reimbursement has a € 25 co-payment [17]. Hence, the reimbursement favours people living further away from the clinics because they are more likely to exceed the co-payment (e.g. in rural areas, the reimbursement is not based on public transport as it is often unavailable), which dilutes the association between VPHI take-up and closeness of the providers. The results regarding illness insurance also show that the importance of private clinic proximity is relative to health station proximity: take-up is higher if a private clinic is closer than a health station or when the health station is not considerably closer than a private clinic.

There are three main findings regarding VPHI take-up and healthcare provision. First, private healthcare provision explained VPHI take-up more than public healthcare provision. Bíró and Hellowell [13] found similar results from the UK where the probability of private health insurance coverage was associated with private inpatient care supply (number of private hospital beds per 1000 inhabitants) but not with public inpatient care supply. Second, geographical closeness of providers was more important to VPHI take-up than prices of healthcare providers. The literature has not studied associations between VPHIs and healthcare prices. We found that, despite being a very tangible feature of healthcare consumption, fees and co-payments mainly did not correlate with the take-up. The unintuitive negative correlation between adults' accident insurance and mean co-payment of private GPs is likely to be caused by some unobserved confounding factor. Third, a relatively weak association between VPHI take-up and all aspects of healthcare provision (and strong associations with sociodemographics) suggests that VPHIs are luxury products that depend on socioeconomic status rather than the prices or closeness of providers.

#### 4.2. Sociodemographic characteristics

Literature has found that the probability of having a VPHI is positively associated with income or financial status [2,13,18,38,39] and education [2,3,18,40]. Earlier findings regarding household size are mixed but tend to support a negative association between VPHI take-up and the number of adults/children in the household [2]. Our results support these earlier findings. We also found evidence of a positive association between illness insurance take-up and employment even if 26–31% of adults had access to private clinics through occupational healthcare and had less use for a VPHI (see Appendix A). This finding is in line with the literature [2,13].

The results show that sociodemographic characteristics were more relevant to the VPHI take-up than local healthcare provision. In particular, our results are similar to Valtonen et al. [18] who studied VPHI take-up with individual-level survey data in the Finnish setting. The similarity of our sociodemographic results to Valtonen et al. [18] further shows that our main findings regarding healthcare provision are robust.

#### 4.3. Policy implications

Our results have two main implications for public policy. First, they suggest that the VPHI take-up is associated with higher sociodemographic groups' tastes toward private healthcare services rather than general (dis)satisfaction with public healthcare provision. Hence, a

public policy promoting VPHI take-up (without targeting the low-income and less-educated populations) is likely to primarily affect the more well-off citizens. Second, the results suggest that individuals who purchase VPHIs do not consider public healthcare as an alternative to private clinics. Hence, enhancing public healthcare provision is not likely to increase the privately insureds' demand for public healthcare.

#### 4.4. Limitations

First, the results represent associations, not causal effects. Second, the availability of occupational primary care services was proxied by the share of employed out of all adults. Third, the measures of provider closeness do not take into account that the opening hours varied considerably: some may have been open twice a week and some everyday. Fourth, there were three regions in which the data was not representative (see Appendix E). The estimates are similar when the three regions are excluded, but many of them lose statistical significance (Appendix F). The conclusions presented in Section 4.1 still apply. In particular, estimates of public healthcare provision turn statistically insignificant, strengthening the conclusion that VPHI take-up is associated with private rather than public healthcare provision. Fifth, some of the control variables correlate strongly with each other. There are no major differences to the magnitude of the baseline results when the collinear controls are excluded, but statistical significance of the estimates increases (Appendix F). Sixth, choices regarding econometric methods may affect the results. The results, however, remain mostly intact if we do not weight observations or when standard errors are clustered at the postcode level (Appendix F). The only major difference is that without the weights the association between adults' VPHI take-up and health station closeness become statistically significant.

### 5. Conclusions

We used nationwide register data to estimate the associations between voluntary private health insurance take-up and local healthcare provision in Finland. Public primary care is provided for all residents in Finland and other Nordic countries, but private insurance allows preferential access to private clinics. Our results show that private health insurance take-up was associated with employment, income and education rather than healthcare provision. This consolidates the view that private health insurance take-up relates to higher sociodemographic groups' preferences for private healthcare rather than citizens' (dis)satisfaction regarding healthcare provision. The healthcare provision was associated with the insurance take-up mainly through geographical closeness of private clinics, whereas geographical closeness or outsourcing of public providers or prices of (public or private) providers were not associated with the take-up. We did not find differences in adults' and children's private health insurance take-up. Instead, take-up of insurance with accident and illness coverage correlated more with incomes and employment than policies with only accident coverage.

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#### Declaration of Competing Interest

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### Supplementary material

Supplementary material associated with this article can be found, in the online version, at [10.1016/j.healthpol.2023.104820](https://doi.org/10.1016/j.healthpol.2023.104820).

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