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Do Firms with Low Disability Risks Opt Out from Public to Private Insurance?

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Abstract:
In the Netherlands, firms may opt out from public to private disability insurance (DI). Opponents of this "mixed market" for insurance argue that it may trigger a segmentation between firms with high risks with public insurance and low disability risks with private insurance. This article tests the importance of such risk segmentation, using administrative information on DI benefits and opting-out decisions of a panel of about 250,000 Dutch firms between 2007 and 2011. We find strong selection into private insurance of firms with low recent DI inflow rates and low current sickness rates. Accordingly, private insurers succeeded in attracting firms with low anticipated DI benefit costs in the first years to come. Our results also suggest that these effects are transitory – that is, firms that opted out have DI risks that are not structurally lower.

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JEL classification: panel data models (C23), health insurance, public and private (I13)
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1 Introduction

In most OECD countries, mandatory schemes for disability insurance (DI) are provided by one public insurer that ensures full coverage of DI risks of employed workers. As an alternative to a public monopoly, however, one may think of systems where firms have the possibility to opt out from public insurance and become self-insured or receive private insurance in a mixed market. This setting is most common for private Workers' Compensation (WC) schemes in the US and Canada – see e. g. Morantz (2010) who describes the consequences of opting out of WC in the state of Texas. In the context of public DI systems, however, mixed markets with one public insurer and multiple private insurers that have room to screen and select firms are limited to the Netherlands only. Similar to the WC system in the US and Canada, opponents of opting out therefore point at the segmentation of risks that may occur in mixed markets, leaving firms with high DI risks in the public scheme.

The selection of risks by insurers is a topic that has spurred a growing body of research – see e. g. Cohen and Siegelman (2010) for a recent survey. This literature started with the seminal article of Rothschild and Stiglitz (1976), who derived the conditions for adverse selection – i. e. a positive correlation between insurance coverage and ex ante risk. Cohen and Siegelman (2010) argue that many studies show no correlation between coverage and ex post claims; thus, adverse selection is small and may be offset by contextual factors and heterogeneous risk aversion – see also De Meza and Webb (2001).

The aim of this article is to study the risk segmentation between public and private insurers that provide DI in the Netherlands. The key question is whether firms with low DI risks were more likely to switch from public to private insurance than firms with high DI risks. We characterize risk segmentation as adverse selection, as firms with low DI risks may have an interest in insurance pooling with other firms with low DI risks. At the same time, it should be stressed that our analysis deviates from the standard adverse selection model of Rothschild and Stiglitz (1976) in two important aspects. First, Dutch law stipulates that DI insurance is mandatory to all firms with fixed benefit conditions, leaving no room for lowering insurance coverage for their workers. Second, private insurers could exploit the fact that they were able to screen and select firms with low DI risks – and the public insurer not. Contrasting to the Rotschild and Stiglitz model with asymmetric information, private insurers thus could use and exploit public information to attract firms with low DI risks.

In our empirical analysis, we consider differences in DI inflow rates between firms that opted out to private insurers and those that did not between 2007 and 2011. In this period, the share of firms with private insurance

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increased from 17 % to 21 % – and with virtually all switches taking place from public to private insurance. We distinguish between differentials in DI inflow rates close to the moment of opting out and in the years afterward. The argument for this is that insurers can reasonably well predict the inflow of DI claimants in the first years to come as they observe the number of long-term absentees that may enter into DI. Two years after opting out, however, there are no significant differentials in DI inflow rates between firms that have opted out and those who have not. This suggests no room for adverse selection on structurally lower DI risks.

We will argue that the potential financial gains from opting out differed between firms that were classified as "large" and "small" by the public insurer when setting DI premiums. As there was a cap on maximum DI premiums, experience rating in the public scheme was "incomplete." Particularly for small firms, premium caps induced substantial cross-subsidies from overpayers to underpayers of DI benefits. Accordingly, the financial gains from opting out were larger for small firms without any DI enrollees than for large firms without any DI enrollees. We exploit this setting by using a regression discontinuity (RD) design that tests whether the association between DI risk and insurance status – i. e. public versus private – was stronger for small firms below the cutoff point than for large firms above the cutoff. If affirmative, this points at adverse selection.

Overall, our findings can be summarized as follows. First, we find that firms with low DI inflow rates in recent years were more likely to opt out to private insurance. As DI inflow accumulates into (higher) DI enrollment rates that could persist over the years to come, this suggests that private insurers anticipated the *level* of DI benefit costs in the near future. Second, private insurers succeeded in attracting firms with low DI inflow rates in the first 2 years after opting out. This finding follows from the institutional setup in the Netherlands: with a mandatory 2-year sickness period that precedes DI claims, firms could reasonably well predict the DI inflow in the 2 years to come. Third, DI risk selection was more important to the group of small firms with a low degree of experience rating than for large firms with a high degree of experience rating. We argue that this difference was driven by the specifics of the experience-rating system, which in turn provided room for adverse selection for small firms. Finally, firms that opted out do not show lower DI risks in the long run, suggesting that risk selection by opting out was beneficial in the short run only.

Our findings essentially contribute to two strands of literature. First, we add to a broader literature that studies the presence of adverse selection in social insurance – see Cohen and Siegelman (2010), Chiappori and Salanié (2000), and Dionne, Fombaron, and Doherty (2012) for surveys. Typically, adverse selection in this literature focuses on health insurance, annuities or automobile insurance, but not DI benefits. We are not aware of studies on adverse selection effects among firms, rather than individual consumers – and certainly not in the context a mixed market with one public insurer and multiple private insurers.[1] Also, the specific setup of DI in the Netherlands makes it important to distinguish between short-run and long-run risk differentials for the assessment of selection effects.

The second relevant strand of literature studies the implementation of DI experience-rating and opting-out systems. As to studies on experience rating in WC, opting out can be regarded as the option to become "fully-experience rated" – see Hyatt and Tomason (1998) and Tompa, Cullen, and McLeod (2012) for surveys of the literature on the effects of experience rating. In Europe, DI experience rating is used only in DI schemes in the Netherlands and Finland (Koning 2009; Kyyrä and Tuomala 2013; De Groot and Koning 2016). Finally, most evidence on mixed systems focus on WC in the US. This literature predominantly addresses the motives for self-insurance and the incentives non-subscribers have in underreporting injury rates – see Butler (1996) and Morantz (2010), respectively. Morantz (2010) surveys large employers that opted out in the state of Texas. She argues that the vast majority of them (98 %) judged the switch as a success that led to substantial cost savings. Butler (1996) finds that differences in reported lost work days between insured and self-insured employers are due to differences in non-reporting.

This paper proceeds as follows. Section 2 explains the institutional setting of DI in the Netherlands, particularly the conditions of opting out and experience rating in public DI insurance. Section 3 presents the data we use, as well as the empirical approach we follow to test for selection effects. Section 4 presents the estimation results, and conclusions are drawn in Section 5.

2 Institutional Setting

2.1 DI in the Netherlands

In the Netherlands, the provision of (either private of public) DI to their workforce is mandatory for all firms. Workers are entitled to apply for DI claims after a waiting period of 2 years of sickness absence. During this period, firms are responsible for the provision of reintegration activities and the continued payment of wages. DI claims are assessed by the Dutch public social benefit administration (UWV), with DI benefits providing

insurance for in general 70 % of the loss of gross income due to impairments. Workers may thus receive partial DI benefits, which are supplemented by UI benefits if the residual earnings potential is not used to its full extent.

The Netherlands has long been characterized as the country with the most out-of-control disability program of OECD countries (Burkhauser et al. 2014). Expressed as a percentage of the insured working population, DI enrolment increased rapidly to about 12 % in the mid-1980s and then it remained more or less constant at this unprecedented level until the beginning of the twenty-first century. It took until the beginning of this century to implement radical reforms that were effective in curbing DI inflow and DI enrolment. Figure 1 shows that these reforms increased the financial responsibilities for firms in most cases. The continued payment of wages by firms started in 1997 and was effectively extended from 1 to 2 years in 2005. In addition, DI experience rating was introduced in 1998, which was combined with the introduction of opting out to private insurance of firms. The evidence suggests that firm incentives in the Netherlands have contributed substantially and significantly to a reduction of DI inflow and DI enrolment in the Netherlands (Koning and Lindeboom 2015). Firm obligations during the waiting period that precedes DI claims also have been increased in 2002, when the Gatekeeper protocol was enacted that aimed at stronger reintegration and screening activities in the period of sickness. Finally, in 2006, the new DI program introduced the distinction between two types of benefits – one for workers who are fully and permanently disabled (IVA) and one for workers who are partially and/or temporary disabled (WGA).

Figure 1: Timeline of sick pay and disability insurance reforms in the Netherlands.

2.2 Public DI

Dutch firms are publicly insured by the Employee Insurance Agency (UWV) by default. They pay an insurance premium that is based on an actuarial system of experience rating of the firm's claims of DI in the past ten years.[2] From an actuarial perspective, the system of public insurance is pay-as-you-go funded – see De Groot and Koning (2016) for a detailed explanation. Experience rating is "incomplete," as DI premiums are capped at a maximum premium rate. A lower maximum premium increases the amount of cross-subsidies from low-risk firms to high-risk firms, which in turn increases the potential gains from opting out for firms without enrollees.

In the period under investigation, the degree of DI experience rating in the public system differed substantially between firms that were classified as paying a "small" wage sum and firms that were classified as paying a "large" wage sum. Each year, the cutoff value of the firms' wage sum was set equal to the product of the wage sum of an average worker in the Netherlands, multiplied by 25. Thus, for a firm that paid average wages that correspond to the average wage in the Netherlands, the threshold value corresponded to 25 workers. Maximum DI premium rates were set 25 % lower for small firms than for large firms. Between 2007 and 2011, the maximum premium ranged between 1.5 % and 2.1 % of the wage sum of large firms, whereas the maximum premium ranged between 1.1 % and 1.5 % of the wage sum of small firms (Cuelenaere et al. 2013).[3]

To shed more light on the importance of maximum premiums and incomplete experience rating, Figure 2 shows the share of firms with DI enrollees that pays a premium that is capped in 2011 as a function of employer size. In the figure, employer size is proxied by the ratio of the total wage sum of the firm and the average wage sum per worker in the Netherlands in 2011. Accordingly, the employer size of 25 workers corresponds to the cutoff point that determines whether firms are classified as small or large. The figure shows that almost all small firms with DI enrollees pay the maximum DI premium. Around the cutoff point, however, we observe a substantial downward jump in the number of firms paying the maximum premium; this reflects the effect of the increase in the maximum premium at this point.

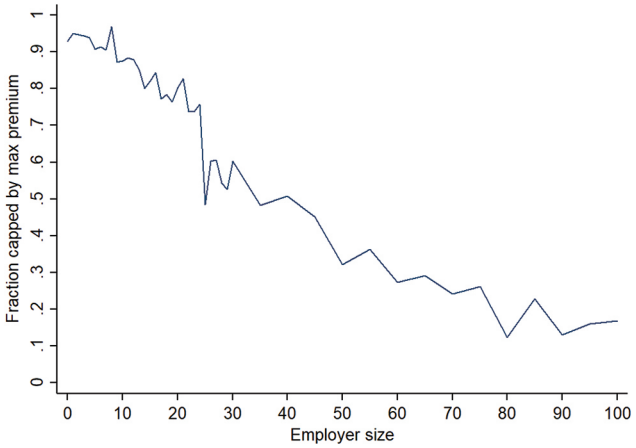

Figure 2: Fraction of employers with DI benefit costs with a premium that is capped by the maximum premium in 2011 (full sample).

2.3 Private DI

As an alternative to the public insurance provider, Dutch firms that have existed for at least 2 years may switch to insurance from a private DI insurance provider to bear the financial risks of DI benefit costs.[4] When opting out, firms with enrollees in DI have to post either a bond or a deposit of securities to warrant the continued payment of DI benefits. Due to strict financial regulations, almost all firms were (and still are) not capable of bearing this financial responsibility on their own (i. e. "self-insurance") and therefore they choose for private insurance. Opting out also implies that private insurers become formally responsible for the prevention and reintegration activities of insured workers. From an actuarial perspective, the requirement to the private insurers is that the DI premium is capital funded.

Between 1998 and 2003, only about 3 % of firms had opted out to private insurance in the Netherlands (Zwinkels, Brouwer, and Braat 2006). But in 2004, there was a large jump to about 20 % of the firms that received private insurance. With the extension of the wage continuation period and the start of the new DI scheme in 2006, many firms and private insurers expected a full privatization of the DI scheme in the years to come. As a result, private insurers took the opportunity to offer contracts to firms with DI premium rates that often were lower than those of the public employee insurance agency (Cuelenaere et al. 2013).

There is evidence from websites that private insurance providers tried to attract firms without any DI enrollees and without sick-listed workers. As an example, we refer to the website www.vanpublieknaarprivaat.nl, on which firms are advised to opt out only if they have no enrollees and no workers that have been in the sickness waiting period for more than 6 months. Contracts for small firms typically had uniform premiums that were set at the level of (two-digit) sectors – so without any experience rating. In this respect, it is important to stress that the cutoff worker-size point that private insurers use to distinguish small and large firms is much higher than that of the public insurer (Timmer 2014). Cuelenaere et al. (2013) characterize contracts between private insurers and larger firms – mostly with 100 workers or more – as "taylor-made," but also as highly non-transparent.

It is generally acknowledged that the market for private insurance of DI in the Netherlands was highly competitive in the period of investigation. Although the three largest private insurance companies constituted a market share of about 65 %, private insurers were willing to incur substantial financial losses in order to increase their market shares (Cuelenaere et al. 2013). Apparently, this strategy was most rewarding for contracts with large firms that were offered large premium discounts. Survey outcomes by Cuelenaere et al. (2013) among firms also suggest that prevention and reintegration activities of private insurers were limited. Firms with disabled workers did not experience an increase in activities, compared to public insurance in earlier years. It thus seems that competition among private insurers was largely driven by premium differentials, rather than by activities that aimed at reducing DI costs of the firms.

3 Data and Empirical Implementation

3.1 Firm-Level Data

For our analysis, we use annual administrative firm-level data of UWV that include firm characteristics, the insurance status (public or private) and the DI award (i. e. the inflow) and DI enrollment – all measured from 2007 to 2011. In principle, the dataset covers all firms in the Netherlands with wage payments for one or more employed workers. For our empirical analysis, we focus on firms that are observed at least two times in the period of investigation. The statistics of the full sample (404,139 firms) and selected sample (246,969 firms) are displayed in Table 1.

Table 1: Full and selected employer sample statistics (standard deviations in parentheses)

	Full sample		**Selected sample**					
			All		**Public insurance**		**Private insurance**	
Private insurance	0.296	(0.456)	0.305	(0.451)				
DI inflow rate per insured worker (fte)	0.174	(2.504)	0.179	(2.529)	0.180	(2.539)	0.178	(2.496)
DI enrolment rate per insured worker (fte)	0.731	(62.00)	0.460	(4.176)	0.475	(4.468)	0.427	(3.855)
Years								
2007	0.169	(0.375)	0.184	(0.404)	0.194	(0.396)	0.161	(0.367)
2008	0.205	(0.404)	0.205	(0.404)	0.214	(0.410)	0.184	(0.387)
2009	0.207	(0.405)	0.206	(0.405)	0.217	(0.412)	0.182	(0.386)
2010	0.208	(0.406)	0.206	(0.404)	0.196	(0.397)	0.229	(0.420)
2011	0.211	(0.408)	0.199	(0.399)	0.179	(0.383)	0.244	(0.429)
Premium setting (public scheme)								
Wage sum (x 1,000 Euros)	297.7	(3,238)	443.1	(3,986)	452.5	(4,318)	421.7	(3,474)
Starters (fraction)	0.063	(0.243)	0		0		0	
Small employers	0.942	(0.233)	0.912	(0.283)	0.903	(0.296)	0.932	(0.251)
Large employers	0.058	(0.233)	0.088	(0.283)	0.097	(0.296)	0.068	(0.251)
Number of insured workers per firm	12.1	(107)	17.4	(131)	17.4	(131)	17.5	(132)
Insured workers per firm (fte)	10.1	(110)	15.0	(135)	15.4	(147)	14.2	(104)
Worker composition, measured per employer								
Female	0.447	(0.397)	0.407	(0.358)	0.408	(0.361)	0.404	(0.353)
Age: <35 year	0.468	(0.364)	0.451	(0.315)	0.452	(0.323)	0.449	(0.297)
$35 \leq$ Age $<$ 45	0.248	(0.287)	0.262	(0.245)	0.260	(0.251)	0.267	(0.229)
$45 \leq$ Age $<$ 55	0.188	(0.266)	0.193	(0.225)	0.193	(0.231)	0.193	(0.210)
$55 \leq$ Age $<$ 65	0.096	(0.207)	0.094	(0.172)	0.095	(0.178)	0.092	(0.158)
Sectors								
Agriculture	0.067	(0.251)	0.065	(0.246)	0.058	(0.233)	0.082	(0.274)
Construction	0.062	(0.241)	0.073	(0.260)	0.070	(0.256)	0.079	(0.271)
Industry	0.124	(0.329)	0.145	(0.352)	0.134	(0.340)	0.171	(0.376)
Trade	0.261	(0.439)	0.243	(0.429)	0.237	(0.425)	0.256	(0.437)
Transportation	0.036	(0.187)	0.042	(0.200)	0.041	(0.199)	0.043	(0.202)
Services	0.200	(0.400)	0.207	(0.405)	0.211	(0.408)	0.199	(0.400)
Temporary work agencies	0.008	(0.091)	0.009	(0.094)	0.011	(0.106)	0.003	(0.057)
Healthcare	0.113	(0.317)	0.107	(0.309)	0.112	(0.316)	0.095	(0.294)
Education	0.004	(0.060)	0.005	(0.073)	0.007	(0.084)	0.001	(0.033)
Public sector	0.002	(0.042)	0.003	(0.058)	0.003	(0.059)	0.001	(0.028)
Other	0.122	(0.327)	0.101	(0.302)	0.107	(0.309)	0.070	(0.028)
Number of observations	1,513,598		994,868		691,051		303,817	
Number of employers	404,139		246,969		192,931		87,650	

Firm-level DI award (or: inflow) and DI enrolment rates are measured as a percentage of the insured population of workers per firm in the previous year. The corresponding firm-level DI inflow rates and DI enrolment rates are substantially lower than the worker-level DI rates that are commonly reported. This is because experience rating was limited to the scheme of partially and/or temporarily disabled workers (WGA) only; it thus excluded the scheme for permanently and fully disabled workers (IVA).

Table 1 shows that, on average, about 30 % of all firms had opted out from public to private insurance in the period of investigation. For the selected sample, we find that the annual DI inflow rate is equal to 0.18%. Rates

are almost equal for firms with public and private insurance, but DI enrolment is somewhat lower for firms with private insurance. When comparing the last two columns of Table 1, opting out is more prominent among smaller firms and firms in the agricultural sector, the industrial sector and the construction sector.

3.2 Testing for Selection Effects

A common theme in the literature on insurance contracts concerns the separation of risk selection from moral hazard effects – see e. g. Cohen and Siegelman (2010) and Chiappori and Salanié (2000) and Schellhorn (2001). Within the current analysis, however, our aim is not to separately assess the importance of both of these effects when comparing DI inflow rates of firms with public DI and private DI.[5] Rather than that, we will estimate models that may or may not provide evidence on selection effects. The basic idea is that we compare DI inflow rates of firms that opted out to those that did not, both in the years before and after the moment of opting out. Given the institutional setup, we argue that these relative DI inflow rates in the years before opting out as well as in the first and second years after opting can be interpreted as selection effects.

In what follows, we will specify DI inflow models allowing for tests on selection effects that essentially stem from three sources of information private insurers could use to screen and select firms with low DI risks. First, firms may have focused on firms with characteristics that are associated with lower or higher DI inflow rates, such as the economic sector, firm size or the composition of workers. Second, private insurers could simply offer contracts to firms with either low DI inflow or low DI enrollment rates. As DI premiums were experience rated incompletely in the public scheme, opting out could be beneficial for firms (and private insurers) if they had low current DI benefit expenses of formerly employed workers. Finally, the current sickness-absence rate of a firm could be informative on the expected future DI inflow of a firm.

We present linear models for the firm-level DI inflow rates that capture all three sources of (adverse) selection. To start with, we specify the annual DI inflow rate of firm i ($i = 1, \ldots, N$) in year t ($t = 1,\ldots,T$).

$$DI\_inflow_{it} = \gamma\, I\,(Private_{it} = 1) + \; X_{it}\,\beta + Y_t + \; \varepsilon_{it} \tag{1}$$

In this equation, the first year in our sample corresponds to 2007 ($t = 1$) and the last year corresponds to 2011 ($t = T = 5$). Note also that we have an unbalanced panel of firms, so there may be combinations of firms and years that are missing in our sample. $I\,(Private_{it} = 1)$ is a dummy indicator for whether firm i received private insurance in year t. The vector X contains fractions of age and gender categories per firm and the economic sector – all of these characteristics can also be observed by the private insurers. In addition, Y refers to dummy indicators for year.

The parameter of interest in the above equation, γ, describes the difference in DI inflow between firms that have opted out to private insurance and those that have not. Equation (1) is estimated with OLS; the standard errors are clustered by firm. It is important to stress that the differential cannot be interpreted as causal. Still, this specification enables us to simply test for selection on observed firm characteristics by comparing the estimate of γ with and without using X as additional controls. This provides us with evidence on selection on observed individual characteristics of firms, i. e. our first hypothesis of interest.

We extend eq. (1) by allowing γ to differ between firms that opted out before 2007 (with the timing of opting out being unobserved) and firms that opted out between 2007 and 2011, for which we observe the year of switching:

$$DI\_inflow_{it} = \gamma_0\, I\,(Private_{i1} = 1) + \; \gamma\, I\,(Private_{it} = 1|Private_{i1} = 0) + X_{it}\,\beta + \; Y_t + \; \varepsilon_{it} \tag{2}$$

As γ_0 gives an estimate of the effect of private insurance for firms that opted out prior to 2007, any differences with γ provide insight into the persistence of DI risk differentials. If private insurers manage to attract firms with structurally lower DI risks while not benefitting from short-term gains, this corresponds to the null hypothesis $\gamma_0 = \; \gamma$.

We next model the evolution of DI risks of firms that have opted out in the period under consideration, as compared to firms that remained insured publicly. As we argued earlier, this allows us to shed more light on the nature of selection effects on DI risks. We exclude firms that opted out prior to 2007, the argument being that the moment of opting out is unobserved for this group. Denoting τ_i as the year the ith firm has opted out, this yields the following specification:

$$DI\_inflow_{it} = \sum_{s=(-T-1)}^{T-1} \gamma_s\, I\,(t = \tau_i - s) + \; X_{it}\,\beta + Y_t + \; \varepsilon_{it} \tag{3}$$

with I as a dummy indicator and the parameter γ_s measures the size of firm-level DI risks s years before or after the moment of opting out (if observed). As stated earlier, our unbalanced panel dataset consists of five annual observations per firm at maximum ($T = 5$). Based on the information of firms that opted out in 2008, we can identify γ_{-1} as the "pre-opting-out" differential in 2007 and γ_1, γ_2, γ_3 and γ_4 as "post-opting-out" differentials in the years 2008, 2009, 2010 and 2011, respectively. Thus, post-opting-out effects can be measured up to the fourth year with private insurance. At the other extreme, for firms that opted out in 2011 we can identify γ_{-4}, γ_{-3}, γ_{-2} and γ_{-1} as "pre-opting-out years" and γ_1 as the first year with the new insurance status.

Equation (3) can be estimated by OLS and firm fixed effects (FEs). The specification of firm-level FEs allows for a more flexible setup where cohorts of firms that opted out in a particular year may have differences in (time-constant) DI inflow rates. At the same time, however, the inclusion of firm-level FEs renders it impossible to compare between firms that opted out and those that did not. For the latter group, there is no "within variation" in insurance status over time. We therefore exclude the coefficient γ_{-4} from the equation to take this as a reference point, yielding estimates of DI inflow patterns that are compared with the outcomes of switching firms four years before opting out.

Based upon the coefficient estimates of γ_s ($s = -4,\ldots, 4$), we can formulate hypotheses on the presence of selection on past DI inflow rates and expected DI inflow rates. As to the first potential source of selection, firms that opted out must have shown lower DI inflow rates in the years before the switch. This type of selection would thus imply that $\gamma_s < 0$ for $s < 0$, or: $\{ \gamma_{-4} < 0;\ \gamma_{-3} < 0; \gamma_{-2} < 0; \gamma_{-1} < 0\}$. In addition, private insurers may also have aimed at attracting firms with low absenteeism rates, as this increased the odds of having low DI benefit claims in the years to come. With a maximum mandatory sick-pay period of 2 years, private insurers could reasonably well forecast the DI inflow of firms in the short run. The presence of such *anticipation* effects would thus imply $\{ \gamma_1 < 0\ ;\ \gamma_2 < 0 \}$. We argue that particularly the first-year impact (γ_1) cannot be qualified as a"true" incentive effect from switching to private insurance, as inflow into DI is largely determined by long-term absence in the preceding years.[6]

3.3 Testing for Adverse Selection

Thus far, we have formulated specifications that provide tests on the presence of risk selection or risk separation that is based on different sources of information. Supposing that this provides evidence for risk selection, however, we cannot conclude that selection was adverse as well. Albeit likely, we cannot be sure that selection was driven by differences in the maximum of experience rating.

That said, we do observe the experience-rating settings of the public scheme that also may have affected the decision to opt out, or not. Recall from Section 2 that publicly insured firms that were classified as small had a substantially lower degree of experience rating than those that were classified as large. We can exploit this threshold as an exogenous shock that affects the potential financial benefits or financial losses of opting out. Below the cutoff point, firms with low expected DI benefit costs had a stronger interest in opting out than similar firms with low expected DI benefit costs that were located just above the cutoff. And reversely, firms with high expected DI benefit costs and with a firm size below the cutoff may have had less interest in opting out than firms with high expected DI benefit costs that were located above the cutoff.

It is reasonable to assume that the cutoff between small and large firms used by the public insurer was exogenous to the firm, as it was based on the average wage sum in the Netherlands. As this amount was determined with a delay of 2 years, firms close to the cutoff could not anticipate and change their total wage sum to change their status.[7] We thus propose to use a RD design to analyze changes in risk selection by firms that opted out. We hypothesize that the downward impact on DI premium rates of firms that follows from risk selection is larger for small firms below the cutoff than for large firms above the cutoff, since the benefits of opting out are large for the small firms. Consequently, we re-estimate eq. (3) for firms that are close, but lower than the cutoff point and for firms with sizes that are close but higher than the cutoff point. Next, the comparison of γbetween both groups of firms provides us with a test on the presence of adverse selection. These selection effects may be relevant both for DI risk differentials in the years preceding opting out, and for those in the years after opting out – in the short term as well as in the long term.

4 Estimation Results

4.1 Selection Effects

We start by estimating the DI inflow rate as a function of year dummies, firm size dummies, worker fractions of gender and age categories and (69) sector dummies (i. e. eq. (1)). We next extend the model with distinct effects

for firms that opted out before and after 2007 (i. e. eq. (2)) and with the evolution of opting-out effects eq. (3). The estimation results of these models are all shown in Table 2.

Table 2: DI inflow model estimates (eqs (1), (2) and (3))

	(i)	(ii)	(iii)	(iv)	(v)
Opting out before 2008 included?	**YES**	**YES**	**YES**	**NO**	**NO**
Estimation method	**OLS**	**OLS**	**OLS**	**OLS**	**FE**
Public insurance	Reference	Reference	Reference	Reference	
Private insurance	−0.0076	−0.017***			
	(0.0056)	(0.0057)			
Private insurance: opting out in 2008–2011			−0.098***		
			(0.0079)		
Private insurance: opting out before 2008			0.013*		
			(0.0067)		
Time frame around moment of opting out:					
4 years before				−0.048***	Reference
				(0.017)	
3 years before				−0.103***	−0.061***
				(0.0080)	(0.020)
2 years before				−0.111***	−0.088***
				(0.0087)	(0.022)
1 year before				−0.145***	−0.147***
				(0.0068)	(0.0022)
1st year				−0.170***	−0.183***
				(0.0063)	(0.023)
2nd year				−0.128***	−0.162***
				(0.010)	(0.027)
3rd year				0.027	−0.044
				(0.034)	(0.043)
4th year				0.030	−0.046
				(0.038)	(0.048)
Year dummies	X	X	X	X	X
Employer controls [a b]		X	X	X	X
Sector dummies (69)		X	X	X	
Root MSE	2.526	2.508	2.508	2.470	
R-squared	0.0001	0.0012	0.0013	0.0017	0.0000
Number of observations	999,868	963,500	963,500	743,324	743,324

* and ***: statistically significant at the 10 % level and 1 % level, respectively.
Standard errors clustered by firm in parentheses.
[a] We estimate the effect of employer size as a step function with the following intervals: 25–34, 35–49, 50–74, 75–99, 100–250 and >250 insured workers.
[b] Worker composition controls include the share of female workers, as well as the shares of the following age categories: < 35, 35–44, 45–54 and > 55 or older.

The first column of Table 2 reports a small and insignificant differential in DI inflow rates for firms that opted out compared to those that did not opt out or did not opt out yet. When including control variables in our regression, however, private insurers show DI inflow rates that are about 10 % lower than for the public insurer. Column (iii) shows that DI inflow rates are markedly lower for firms that opted out after 2007 as compared to firms that opted out earlier than 2007. This indicates that the difference of DI inflow rates between firms with public and private insurance declines over time. This suggests private insurers did not attract firms with DI risks that were structurally lower than for other firms; we return to this matter later on.

Moving to columns (iv) and (v), we zoom into in the pattern of DI inflow in the years before and after the moment of opting out, measured for firms that opted out in the period of investigation. Recall from the previous section that we exclude firms that had private insurance already before 2007; for these, we do not observe the exact timing of opting out. With OLS estimation – i. e. column (iv) – we can compare the pattern of DI inflow rates to firms that remained insured publicly. Both the OLS and FE estimates show that DI inflow risks were substantially and significantly lower and decreased in the years before opting out. Four years before opting out, DI inflow rates were 0.05 percentage points lower – i. e. about 25 % of the average DI inflow rate – compared to the control group of firms that did not opt out in the years in our sample. This difference increases to 0.15 in the last year before the moment of opting out, amounting to about 80 % of the average DI inflow (!). Presumably,

the vast majority of smaller firms opted out if they had no DI inflow at all in the years that were closest to the switch.

There is also strong evidence for anticipation effects on DI inflow rates in the first and second year after opting out. In these years, DI inflow rates are comparable to the year before opting out, but diminish and become insignificant in the years thereafter. In light of the 2-year waiting period before DI claims, private insurers thus probably exploited information on sickness absence to forecast DI inflow rates in the next 2 years to come. This again suggests that differentials in DI risks did not persist over time. Private insurers succeeded in attracting firms with DI risks that were lower in the short run, but not in the long run.

We stated earlier that the FE estimates of the DI inflow pattern allow for differences in DI risks across cohorts that opted out in subsequent years. As such, the FE estimates can be regarded as a robustness test on the OLS estimates. To shed more light on cohort effects, we also conducted a robustness test where we allowed for time patterns that differed between cohorts that opted out. We distinguished between distinct patterns for the 5,742 and 2,837 firms that opted out in 2008 and 2009, respectively, and the 17,254 and 7,613 firms that opted out in 2010 and 2011, respectively. For a time window of 2 years around the moment of opting out, thus including the coefficients γ_{-2},γ_{-1}, γ_1 and γ_2, we can estimate separate parameter values for the two cohort groups. When using a FE specification, this yields outcomes that do not differ significantly.[8]

In summary, private insurers succeeded in attracting firms with low expected DI benefit costs by using information on past DI claims and sickness rates of firms. With DI benefit costs of enrollees that were likely to continue for some years, private insurers could simply screen and select on past and current DI inflow rates. Likewise, screening and selecting on firms with low sickness rate decreased the likelihood of DI inflow – and DI benefit costs – in the first and second years after opting out. Both selection modes helped in attracting DI risks that were substantially lower than for the firms that remained insured publicly, but these effects only pertained for a limited period. Thus, private insurers were not able to attract firms with DI risks that were structurally lower.

4.2 Adverse Selection

Table 3 presents the OLS estimation results of the DI inflow model as in eq. (3), stratified with respect to employer size. Columns (i) and (ii) focus on the sample of firms with wage sums that correspond with 10 to 25 "average" workers and firms with wage sums that correspond with 25 to 40 "average" workers, respectively. For the sample of firms below the cutoff point, the evolution of DI risks in the time frame around the moment of opting is very similar to our earlier results that were obtained for the full sample; this reflects the fact that the majority of firms is located on this part of the support. Above the cutoff point, however, the concerning coefficient values are significantly smaller in almost all cases. This lends credence to the idea that negative risk DI selection of firms was adverse, at least around the cutoff point: a higher degree of experience rating decreases the interest of firms with low DI risks to opt out to private insurance. Also, adverse selection was confined to the years preceding opting out and the first 2 years thereafter. This suggests that there was no selection on DI risks that were structurally higher.

Table 3: DI inflow model OLS estimates on samples that are stratified with respect to employer size categories eq. (3).

Employer size	**(i) 10–25 workers**	**(ii) 25–40 workers**	**(iii) 15–25 workers**	**(iv) 25–35 workers**	**(v) 10–25 workers**	**(vi) 25–40 workers**
Switch between "small" and "large"	Included	Included	Included	Included	Excluded	Excluded
Opting out before 2007	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
Public insurance	Reference	Reference	Reference	Reference	Reference	Reference
Time frame around moment of opting out:						
4 years before	−0.090***	0.034	−0.113***	0.057	−0.095**	0.064
	(0.028)	(0.043)	(0.030)	(0.054)	(0.030)	(0.056)
3 years before	−0.121***	−0.004	−0.104***	−0.007	−0.125***	0.027
	(0.013)	(0.027)	(0.017)	(0.032)	(0.014)	(0.035)
2 years before	−0.118***	−0.017	−0.103***	−0.010	−0.119***	−0.009
	(0.011)	(0.026)	(0.014)	(0.031)	(0.012)	(0.032)
1 year before	−0.143***	−0.098***	−0.127***	−0.100***	−0.143***	−0.130***
	(0.010)	(0.018)	(0.013)	(0.020)	(0.010)	(0.018)
1st year	−0.162***	−0.097***	−0.154***	−0.082***	−0.156***	−0.100**
	(0.009)	(0.020)	(0.011)	(0.023)	(0.010)	(0.026)
2nd year	−0.131***	−0.066***	−0.134***	−0.077***	−0.132***	−0.065**
	(0.012)	(0.022)	(0.015)	(0.025)	(0.013)	(0.030)

3rd year	−0.027	0.029	0.028	0.003	−0.028	0.025
	(0.029)	(0.050)	(0.044)	(0.057)	(0.030)	(0.066)
4th year	0.020	0.014	−0.031	−0.034	0.041	0.030
	(0.042)	(0.053)	(0.044)	(0.054)	(0.046)	(0.074)
Year dummies	X	X	X	X	X	X
Employer controls[ab]	X	X	X	X	X	X
Sector dummies (69)	X	X	X	X	X	X
Root MSE	1.088	0.768	0.966	0.788	1.093	0.777
Number of firms	33,603	8,396	18,134	7,180	29,977	4,794
R-squared	0.012	0.022	0.017	0.020	0.011	0.030
Number of observations	104,467	26,752	49,985	20,080	95,334	18,321

** and ***: statistically significant at the 5 % level and 1 % level, respectively. Standard errors clustered by firm in parentheses.
[a] We estimate the effect of employer size as a step function with the following intervals: 25–34, 35–49, 50–74, 75–99, 100–250 and >250 insured workers.
[b] Worker composition controls include the share of female workers, as well as the shares of the following age categories: < 35, 35–44, 45–54 and > 55 or older.

To test for the robustness of these RD results, we ran additional regressions for different selections of firms. In columns (iii) and (iv) of Table 3, we narrowed the interval around the cutoff point to firms; this yielded parameter outcomes that were similar to those with the smaller bandwidth. We also restricted our samples below and above the cutoff to firms that remained consistently below or above the cutoff point in all of the years they were observed. This also resulted in comparable estimation outcomes – as presented in columns (iv) and (v).

5 Conclusion

In this article we have analyzed DI risk selection of Dutch firms that could opt out from public to private insurance. Unlike the public insurer, private insurers could screen and select on firms with more favorable characteristics, with lower past DI claims and lower current sickness rates. We have tested whether there is evidence for these three types of risk selection, using registered data (for all firms) from the public insurer.

The picture that emerges is that private insurers succeeded in attracting firms with low past and expected DI inflow rates, rather than selecting on firm types with observable characteristics that were associated with lower DI risks. Private insurers used information on current and past DI inflow rates and current sickness to anticipate DI inflow rates and DI benefit costs in the years to come. Accordingly, the DI inflow rates of firms that opted out were substantially lower than of firms with public insurance. Remarkably, the differential in DI inflow rates did not persist over time. Private insurers thus did not succeed in attracting firms with structurally lower DI risks.

Our analysis suggests evidence of adverse selection has occurred, but that the effects are probably limited. Private insurers took advantage of short-term gains of firms with DI risks that were temporarily lower, while the market share of the public insurance provider only slightly decreased in the period under consideration. The mixed market for DI thus appeared quite stable. At the same time, however, it should be stressed that the use of DI experience rating by the public insurer largely decreased the room for adverse selection. In particular, we find stronger risk selection effects for the group of small firms with a low degree of experience rating. It thus seems that the settings of experience rating in the public DI scheme have largely determined the potential for risk selection of opting out. One may even argue that experience rating by the public insurers is a necessary condition for a mixed market of DI to function.

When taking a broader perspective, policymakers will need evidence on the merits of a mixed market where firms can opt out to private insurers. The key question then is whether private insurers decrease the risk of DI benefit costs. Our estimation results provide suggestive evidence that there are short-run benefits to private insurers only, since they can exploit public information to attract firms with low DI risks. In contrast, it appears the DI risks of firms with public and private insurance are equal in the long run. More rigorous research is necessary to formally test this claim. We leave this for future research.

Notes

1 An exception to this are studies on adverse selection effects of opting out in case of statutory health insurance in Germany (Grunow and Nuscheler 2014; Bünnings and Tauchmann 2015; Panthöfer 2016).

2 Since 2006, experience rating in thee Netherlands only applies to DI costs of workers that are in the scheme for partially and/or temporary disabled individuals (WGA), not for fully disabled workers (IVA). Due to administrative delays, DI premiums are based on actual DI risks with a time delay of 2 years.
3 In the years 2007–2011, the maximum premium rates of small firms were equal to 2.10 %, 1.74 %, 1.47 %, 1.59 % and 1.65 %. For large firms, the maximum premium rates amounted to 2.80 %, 2.32 %, 1.96 %, 2.12 % and 2.20 % in the years 2007–2011.
4 Note that the public Employee Insurance Agency remains responsible to the DI claims assessment of workers after opting out.
5 With the data at hand, we cannot exploit exogenous variation in variables that only affect the likelihood of opting out and are not directly correlated to DI inflow.
6 After the second year with private insurance, it is unclear how changes in DI inflow rates can be interpreted. If private insurers manage to reduce DI risks this can be interpreted as moral hazard. At the same time, if DI risks are transitory and private insurers select low risk firms, one would expect mean reversion effects to increase DI risks.
7 De Groot and Koning (2016) conduct McCrary tests on similar administrative data as used in the current study, so as to analyze whether there is bunching behavior of wage sums around the cutoff. In line with expectations, they find no evidence in this direction.
8 For expositional reasons, the outcomes of this robustness test is not reported in this article. It is available on request.

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