

# The impact of supplemental private health insurance on health-related behaviours and outcomes: new evidence from Russia

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Professor Christopher J Gerry  
Director of Russian and East European Studies



# Introduction

- This is a joint working paper with Ekaterina Alexandrova and Andrey Aistov of HSE St. Petersburg and HSE Nizhny Novgorod respectively
- The paper contributes to the discussion around *ex-post* and *ex-ante* moral hazard in voluntary, supplemental private health insurance particularly for countries in which VHI is complementary to a tax-financed health care system

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# Health insurance, health care & health related behaviour

- The most straightforward theoretical implication of health insurance is that, other things being equal, it will result in increased consumption of health care due to (*ex-post*) **moral hazard**.
- There are two sources of moral hazard:
  - *Ex-ante* (Ehrlich and Becker, 1972) captures the idea that health insurance reduces the incentives for individuals to invest in their health and therefore will be associated with unhealthy behaviours, including increased smoking and drinking, along with decreased exercise and less appropriate diets.
  - *Ex-post* moral hazard, takes the individual's health as given and posits that, at any given level of health, individuals with insurance will consume more health care because the price of health care is lower (Pauly, 1968).

# Health insurance, health care & health related behaviour

- Identifying the **existence** of moral hazard presents a methodological challenge since, in most empirical settings, there are fundamental **selection** differences between those with and without insurance
  - The ‘high risks’ (i.e. least healthy) self-select into insurance, so that both adverse selection and moral hazard are consistent with greater *ex-post* utilisation of health care
  - This renders it challenging to disentangle moral hazard from selection effects, but is of crucial importance from a policy perspective since policies to address adverse selection (e.g. mandatory insurance) may exacerbate moral hazard

## Introduction – background on health insurance

- The RAND (Newhouse, 1993) and Oregon (Finkelstein et al., 2012) Health Insurance Experiments, in the US, provided ground breaking experimental settings for distinguishing between moral hazard and adverse selection (by randomising selection).
- They found compelling evidence of *ex-post* moral hazard: ***spending on health care is lower when consumer cost-sharing and out-of-pocket spending requirements are higher.***
- Gave rise to numerous empirical studies exploring the relationship between health insurance and health care utilisation.

# Health insurance, health care & health related behaviour

- Evidence is now clear:
  - Expansions of Medicaid and Medicare, supplemental insurance (e.g. Medigap), and the Patient Protection and Affordable Care Act (ACA) reforms have all been strongly associated with increased utilisation of medical care with and without strong evidence of adverse selection.
  - Research drawing on examples from across Europe also finds evidence of *ex-post* moral hazard.
- *“Moral hazard, in other words, irrefutably exists”* (Einav and Finkelstein, 2017).

# Health insurance, health care & health related behaviour

- This body of research has predominantly adopted the *ex-post* definition but, as the link between unhealthy behaviours, population health and the growth of health care expenditure becomes better understood, explorations of ***ex-ante* moral hazard (e.g. health behaviours)** have proliferated.
- But these are also associated with identification problems.
  - For example, we may observe that smoking or alcohol use do not increase after the uptake of insurance.
  - This may indicate the absence of *ex-ante* moral hazard or simply that the greater use of medical services has a counter-balancing effect on health behaviours.



# Health insurance, health care & health related behaviour

- This also implies that the impact of health insurance on **health outcomes** (or on social welfare) is unclear (this is self-evidently crucial):
  - (i) Because any (presumed) benefits of increased health care utilisation may be offset by *ex-ante* reductions in health investments.
  - (ii) Because diminishing marginal returns to health care imply that the impact of additional consumption depends on the initial stock.
  - (iii) Therefore, the impact on health outcomes depends on:
    - the balance of increased (decreased) use of efficacious (inefficacious) medical services;
    - the relationship between health insurance and health behaviours;
    - and the extent to which increased use of medical services is linked with positive changes in health behaviour.

# Health insurance, health care & health related behaviour

- What evidence there is, is mixed.
  - From the RAND experiment, Brook et al. (1983) find no empirical link between smoking or body weight and insurance coverage.
  - Finkelstein et al. (2012) report no evidence of *ex-ante* moral hazard in the Oregon Medicaid experiment.
  - In non-experimental settings, Dave and Kaestner (2009) argue that Medicare is associated with lower levels of physical activity and increased smoking and drinking.

## Health insurance, health care & health related behaviour

- Courtemanche and Zapata (2014) find that the Massachusetts reforms were linked with lower BMI but did not affect smoking or physical activity.
- Simon et al. (2017), find no empirical evidence that ACA Medicaid expansion lead to increased risky behaviours.
- Stanciole (2008), finds that health insurance increases the tendency towards heavy smoking, sedentarism and obesity but decreases the tendency towards binge drinking.
- Courbage and Coulon (2004) find that health insurance increases the propensity for exercise and for breast screening while reducing the likelihood of smoking.

# Health insurance, health care & health related behaviour

- The evidence is also inconclusive on whether insurance **improves health**.
  - In the RAND experiment the positive impact of insurance on health is limited to certain sub-groups, such as the poor.
  - Finkelstein et al. (2012) find that self-reported physical and mental well-being both improve in the Oregon experiment.
  - Expansions to Medicaid have been shown to improve infant health and reduce child hospitalisations.
  - Medicare has been linked with improved self-rated health for certain sub-groups.
  - The Massachusetts reforms have been linked with improved self-assessed health, along with decreased mortality rates.
  - ACA dependent provision reforms have also been linked with improved self-reported health.

## Health insurance, health care & health related behaviour

- In sum, while the fact of the relationship (if not the size) between insurance and *ex-post* moral hazard is both theoretically and empirically well-established, the link between insurance and preventative care use, risky health behaviours and health outcomes is both theoretically and empirically ambiguous (*ex-ante* moral hazard).
- The effects of extending insurance coverage depend on the specific institutional features of the health-care system as well as the social, economic and demographic specificities which drive behaviour.
- We therefore turn next to the specifics of the Russian case.

## The Russian context

- The Russian health system is based on a mandatory health insurance (MHI) premium paid by employers.
- In principle, this finances a national health system which is free at the point of access.
- In reality, the system is seriously under-financed, the care – which is of variable quality – is far from comprehensive, and access to it is characterised by regional, demographic and socio-economic inequalities related to the individuals' capacity to make out-of-pocket payments.
- In practice therefore, there are three access routes to medical care in Russia:
  - employer-financed MHI;
  - out-of-pocket payments;
  - or voluntary health insurance (VHI).

## The Russian context

- A small minority of Russians have access to supplementary VHI schemes either through their employer or through purchasing them directly.
- For most Russians though, the cost of VHI is prohibitive and the self-financing of VHI contracts remains rare.
- Indeed, according to the Russian Bureau of Statistics only 5.4% of all medical appointments are VHI-related and, in Moscow and St. Petersburg, corporate VHI contracts account for 95% of the VHI market.
- Nevertheless, the health insurance market is growing and the number of VHI contracts has increased from around 6.6 million in 2000 to almost 11.4 million in 2016, corresponding to approximately 4.5%–8% coverage of the Russian population.

## The Russian context

- This set of institutional arrangements allows us to identify three sub-groups of the population:
  - (1) The largest group is reliant on MHI (and out-of-pocket expenditure) only;
  - (2) A group that receive supplemental VHI through association with their enterprise;
  - (3) A group that choose to finance supplemental VHI themselves.
- Our interest is in observing how and whether membership of one or other of these insurance groups impacts on health outcomes and health behaviours.



## The Russian context

- These institutional configurations allow us to unpick some of the classical asymmetry of information challenges.
- We have two distinct ‘types’ of consumers: those that choose to purchase their own health insurance and those that have health insurance provided by their enterprises.
- The price changes apply to both types but the mechanisms through which they are ‘selected’ for health insurance differ.

## The Russian context

- So, while distinguishing moral hazard from adverse selection is speculative in the case of those self-selecting into VHI, in the case of enterprise provided insurance, adverse selection is negligible.
- It is not plausible that respondents have chosen their employer based on the provision of VHI.
- We are therefore able to distinguish the effects of post-contract opportunist behaviour from adverse selection and to compare pre- and post-contract behaviours and outcomes across groups.

## Data and methodology

- This research draws on Phase II of the Russia Longitudinal Monitoring Survey – Higher School of Economics survey data (hereafter, RLMS).
- In this paper we use the adult survey data from 2000-2016 inclusive, restricting our sample to adults above mandatory schooling age (17) and to those below age 72.
- We identify eight health outcome and behaviour dependent variables as well as a rich range of explanatory variables.
- The main explanatory variable of interest is drawn from a question, included since 2000, asking if individuals have VHI and how it was financed including a VHI indicator.

# Data and methodology

Variable name	Variable definition
Visits to doctor	1, < annually; 2, annually; 3, 2-3 times a year; 4, monthly; 5, several times per month (Since 2004)
SAH	Self-assessed health: 1, very bad; 2, bad; 3, average; 4, good; 5, very good
BMI decile	Body Mass Index as categorical variable representing deciles
Smoker	1 if a respondent smokes, 0 otherwise
Cigarette consumption	1, 1-9 per day; 2, 10 per day; 3, 11-19 per day; 4, 20 per day; 5, > 20 per day
Drink	1 if a respondent ever drinks, 0 otherwise
Alcohol consumption	1, once last month; 2, 2-3 times last month; 3, weekly; 4, 2-3 times a week; 5, 4-6 times a week; 6, daily
Physical exercise	1, none; 2, light exercise; 3, moderate exercise; 4, intensive exercise; 5, daily
Male	1 if male, 0 if female
Children <3 yrs in HH	The total number of children <3 years old in the household
Chronic disease	Self-reported lung, kidney, liver, heart, gastrointestinal or spinal disease
Age	Age in years
log of income	The natural logarithm of respondent's monthly income in 1992 rubles
Education	4 dummy variables for: secondary school, vocational training school, technical college and university.

## Data and methodology

	Without VHI		Self		Enterprise	
	Mean	s.e.	Mean	s.e.	Mean	s.e.
<b>Visits to doctor</b>	2.178	0.006	2.425	0.077	2.334	0.027
<b>SAH</b>	3.130	0.003	3.211	0.036	3.268	0.014
<b>BMI decile</b>	5.469	0.013	5.479	0.170	5.737	0.068
<b>Smoker</b>	0.323	0.002	0.304	0.027	0.354	0.012
<b>Cigarette consumption</b>	3.019	0.010	2.943	0.145	3.164	0.051
<b>Drink</b>	0.728	0.003	0.852	0.031	0.839	0.011
<b>Alcohol consumption</b>	2.422	0.007	2.581	0.086	2.561	0.032
<b>Physical exercise</b>	1.362	0.005	1.552	0.071	1.601	0.030

## Data and methodology

- Visits to the doctor are lower among those without any form of VHI but are higher among those self-financing their VHI.
- Damaging health behaviours are more prevalent among those with VHI, particularly as concerns drinking.
- Those with enterprise VHI have higher self-assessed health.
- Those with self-provided VHI have the highest number of doctor visits, the lowest incidence of smoking, the highest alcohol consumption.

## Data and methodology

- We estimate six fixed effects ordered logit models,

$$\begin{cases} y_{it}^* = \alpha_i + x'_{it}\beta + \varepsilon_{it}, & i = 1, 2, \dots, n, \quad t = 1, 2, \dots, T, \\ y_{it} = j, \quad \gamma_{i,j-1} < y_{it}^* \leq \gamma_{ij}, & j = 1, 2, \dots, M-1, \quad \gamma_{i0} = -\infty, \quad \gamma_{iM} = \infty, \end{cases}$$

- In which  $y_{it}^*$  reflects one of six individual ( $i$ ), time-specific ( $t$ ), latent dependent variables (doctor visits, cigarette consumption, alcohol consumption, BMI decile, self-assessed health and physical exercise)
- $Y_{it}$  is the  $i$ -th respondent's answer to the corresponding ordered choice question in the period  $t$ .
- $M$  is the number of possible responses from which the  $i$ -th respondent chooses the  $j$ -th option,  $x'$  is the column vector of the  $k$  explanatory variables and the error term  $\varepsilon_{it}$  captures the unobserved characteristics that vary between individuals and over time.
- There is a strong possibility that these unobserved characteristics are correlated with the explanatory variables

## Data and methodology

- In the case of the non-linear FE model, the estimates derived from short panels are inconsistent due to the ‘incidental parameters problem’.
- The bias falls between 16% and 7% for panels of  $T=10$  and  $T=20$ .
- In our case with  $T=16$  (and 12 for two of our dependent variables) we fall between these bounds and therefore adopt an amended approach.
- We attenuate the inconsistencies in our estimates through the application of a ‘BUC’ (blow-up and cluster) methodology.
- Each observation in the sample is replaced by  $M-1$  copies of itself (blow-ups) and each of these replications of the individual’s choice is dichotomized at a different cut off point.
- This process preserves as much information as possible concerning the changes in the dependent variable and is robust to finite samples.
- **Our estimates are therefore those of the conditional logit model estimated on the ‘blown up’ sample.**



## Empirical results: *ex-post* moral hazard

- Our first main finding is that the provision or purchase of supplemental VHI in Russia is very strongly associated with an increase in health care utilisation.
- As expected, given the likelihood of adverse selection, the effect is generally larger in the case of self-provision than in the case of enterprise provision.

<i>Dependent Variable</i>	Pooled	
	Self	Ent
Visits to doctor	0.613*** (0.096)	0.382*** (0.041)
Smoke	-0.323* (0.178)	0.024 (0.075)
Cigarette consumption	0.456*** (0.168)	0.242*** (0.070)
Drink	1.049*** (0.193)	0.305*** (0.070)
Alcohol consumption	-0.010 (0.110)	0.105** (0.042)
Physical exercise	0.226* (0.123)	0.131*** (0.050)
SAH	-0.074 (0.104)	-0.023 (0.045)
BMI decile	-0.157* (0.097)	0.081** (0.040)

## Empirical results: *ex-post* moral hazard

- In both cases, the effects are strongest among younger cohorts, those with lower incomes, those with more education and those in Moscow and St. Petersburg.
- For the high-income group, as well as for younger males we find no evidence of *ex-post* moral hazard for the self-insured.
- The effects are larger for women, which is consistent with the much greater access to health care that Russian females have.
- *Overall, these results suggest that, although the self-insured effects appear to conflate adverse selection with moral hazard, in Russia – as in most other countries for which evidence exists – there is strong overall evidence of ex-post moral hazard.*

## Empirical results: *ex-ante* moral hazard

- Some evidence of a relationship between VHI and health behaviours:
  - Smoking – insured smoke more
  - Drinking – insured more likely to drink and enterprise insured drink more
  - Exercise – insured more likely to take exercise
  - BMI – self-insured have lower BMI, enterprise insured have higher BMI

<i>Dependent Variable</i>	Pooled	
	Self	Ent
Visits to doctor	0.613*** (0.096)	0.382*** (0.041)
Smoke	-0.323* (0.178)	0.024 (0.075)
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## Empirical results: health outcomes (SAH)

- Finally, we find very little evidence that either insurance type is significantly associated with self-assessed health.
- In the pooled or sub-group analysis.

<i>Dependent Variable</i>	Pooled	
	Self	Ent
Visits to doctor	0.613*** (0.096)	0.382*** (0.041)
Smoke	-0.323* (0.178)	0.024 (0.075)
Cigarette consumption	0.456*** (0.168)	0.242*** (0.070)
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Physical exercise	0.226* (0.123)	0.131*** (0.050)
SAH	-0.074 (0.104)	-0.023 (0.045)
BMI decile	-0.157* (0.097)	0.081** (0.040)

## Discussion and conclusions

- We find strong evidence that, as elsewhere, *ex-post* moral hazard should be an important consideration in designing health care policy.
- Post-contract visits to the doctor are unambiguously higher for individuals with supplemental health insurance.
- This is true for males, females, the pooled sample and all sub-samples and the finding is robust to different econometric specifications and approaches.
- As expected, the effects are larger for those who have self-insured but this likely reflects their self-selection into health insurance plans.
- Equivalent adverse selection is difficult to contemplate in the case of enterprise provided health care.
- In short, we concur with Einav and Finkelstein (2017) that moral hazard, of the *ex-post* variety, “*irrefutably exists*”.

## Discussion and conclusions

- Consistent with the ambiguous theoretical predictions concerning *ex-ante* moral hazard our findings are less conclusive but are strongly suggestive of links between VHI and *ex-ante* health behaviours and are more contingent on population demographics than are previous findings.
- In Russia, insurance appears to shape some of the behavioural impulses and so policy innovations targeting excess consumption of smoking and alcohol and incentivizing improved nutrition and physical exercise could increase the efficiency of insurance policies and contribute to improved public health.
- Moreover, insurance plans might seek to ‘nudge’ behaviour in ways that will reduce the future flow of health care costs associated with risky health activities such as smoking, drinking and the absence of exercise.

## Discussion and conclusions

- The net effect of insurance on **health outcomes** depends on the changes in both access to care and health behaviours and therefore is theoretically ambiguous.
- Our data offer us limited scope to explore health outcomes, beyond those that we control for in the regressions, but we find no evidence of a systematic relationship – in either direction – between any form of health insurance and health outcomes, as captured by self-assessed health.

## Discussion and conclusions: heterogeneity

- In exploring whether and how these patterns vary according to population subgroup we are constrained somewhat by the number of observations and our findings are only suggestive.
- We do discern clear gender differences, some of which reflect that women in Russia are much more likely to utilise health services.
- We also find that *ex-post* moral hazard (and possibly also adverse selection) is more pronounced among low income groups, younger cohorts, in Moscow and St. Petersburg and among those with more education.
- These groupings reflect combinations of access, understanding and, in the case of low income, need.
- With regard to *ex-ante* moral hazard the patterns are less clear but there is some suggestion that the size of the behavioural effects are greater among low income groups.



## Discussion and conclusions

- In Russia, as elsewhere, there is ongoing discussion concerning the role of VHI schemes aimed at expanding access to health care outside of the increasingly pressured core provision financed through mandatory health insurance.
- Our results make clear that health insurance increases health care utilisation and are suggestive of some increases in unhealthy behaviours, albeit to different extents for different population sub-groups, but find no discernible impact upon population health.

## Discussion and conclusions

- These findings raise important questions:
  - Do the benefits of greater health care use outweigh the incentives to engage more freely in risky behaviours?
  - Does enterprise provided insurance encourage those that under-use health care services (e.g. males, low income groups) to increase their utilisation and thereby positively address health inequalities?
  - How can insurance plans simultaneously increase access to health care while also incentivising health behaviours that reduce the likelihood of health care being needed?