On the inverse relationship between ex-ante and ex-post moral hazard: the case of smokers

Guido Citoni

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I illustrate the amount and significance of such psychological effect by estimating with Italian survey data, a consumption function for medical consultations and diagnostic screenings, in which smokers represent a group with high ex-ante moral hazard and low ex-post moral hazard, while former smokers have low ex-ante moral hazard and high ex-post moral hazard.

The results confirm the theory, though in an asymmetric way: past smokers' consumption shows a strong and significant increase, while current smokers' reduction of use is lower and not always significant.

Keywords: smokers, past-smokers, health care consumption, moral hazard.
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Abstract
In the paper I start from the observation that smokers’ use of services is less than expected and I suggest that this finding is coherent with an hypothesis: there is a psychological component, leading to increased/reduced consumption if the illness was not/was generated by ex-ante moral hazard.
I illustrate the amount and significance of such psychological effect by estimating with Italian survey data, a consumption function for medical consultations and diagnostic screenings, in which smokers represent a group with high ex-ante moral hazard and low ex-post moral hazard, while former smokers have low ex-ante moral hazard and high ex-post moral hazard.
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Introduction
Should smokers pay for their extra-risk? In the US, the Affordable Care Act (ACA) now permits what had already been a common covert insurance practice: to raise premiums for smokers. In a recent study (Kaplan et al. 2014) it is found that the median rates are now 10% higher for smokers, even if the law permits raising them up to 50% above those for non-smokers. The majority of observers, though, believe that 50% is an upper ceiling that will not be reached. We may assume that 25% more expenditure is foreseeable for smokers in US, and that premiums should adjust, but to what extent is the risk of illness increased by smoking?
According to epidemiologists (see La Torre 2013), the relative risk of lung cancer for current smokers is about 9, and nearly all the other forms of cancer have a RR>1.25. The same applies to other illnesses, such as Chronic Obstructive Pulmonary Disease, Coronary Heart Disease, Cerebrovascular Disease, etc. How is it possible that such huge excess risk entails only 25% more expenditure?
The hypothesis suggested in this study is that there should be an offsetting lower consumption for smokers when ill.
Ex-ante (EAMH) and ex-post (EPMH) moral hazard have rarely been considered together, as if they were independent ethical violations. Moreover, ex-ante moral hazard has been more often associated with stigma than its corresponding ex-post, although it is widely acknowledged that the practical effect of the latter is far more important.
This work aims to link the two concepts, showing that there could be an asymmetric inverse relationship between ex-ante and ex-post moral hazard, as exemplified by both current and past smokers: the first certainly have a high ex-ante moral hazard, but may also have a low ex-post moral hazard while the second have in the past reduced their ex-ante moral hazard, but certainly have a strong ex-post moral hazard.
Our hypothesis is that there is a psychosocial motivation for this inverse relationship: we shall sketch it theoretically, though the main task of the paper is an empirical attempt to prove its existence.
The paper is organized as follows: in the background section we analyze if and how the two moral hazard concepts have been considered together and the rationale for our hypothesis; in the following sections we shall outline a simplified empirical model for ex-ante and ex-post moral hazard linkage, and analyze its
implications; the core of the paper is an empirical analysis of the amount of ex-post moral hazard that can be expected from smokers, past-smokers and non-smokers; finally follow the conclusions.

The background
Ex-ante moral hazard is defined as the excess consumption of services induced by lack of prevention activity under the cover of insurance (private or public): individuals feel confident that the excess risk induced by their careless behaviour will mainly be covered by their insurance (a small increase in premium due to their behaviour can nonetheless be anticipated). The exact extent of such ethical violation is apparently not so great (Kenkel 2000, Zweifel-Manning 2000, Dave-Kaestner 2009, Andersen 2012, Courbage-Coulon 2004) - because there is an uncompensated loss in health consequential on underinvestment in prevention effort - except for specific groups of individuals at risk, such as smokers and the obese (Stanciole 2007). Ex-post moral hazard, instead, is excess expenditure due to the perceived zero or low cost of services at the point of consumption for insured individuals (Pauly 1968, 1983, 2004; Nyman 1999, 2015). There is ample evidence of such an effect for private insurance, and the amount is directly linked to the price elasticity of demand\(^1\), and indirectly to the coinsurance rate (Leibowitz et al. 1985, Zweifel-Manning 2000, van Ophem 2012). For public insurance, it is also necessary for the gate-keeping activity of doctors to be contained\(^2\) or undermined by fear due to an imperfect agency relationship (defensive medicine, malpractice litigations, etc.).

To our knowledge, the links between the two concepts that have been explored so far are\(^3\):

1. The distinction between prevention activity (healthy lifestyles or primary prevention) and prevention services (such as check-ups or secondary prevention (see for prevention concepts Kenkel 2000)): the former can be seen as pure ex-ante moral hazard, while the latter is a sort of ex-post moral hazard if it is covered by insurance. The evidence is mixed but probably, contrary to the seminal work of Ehrlich and Becker (1972), insurance coverage decreases the former and increases the latter (Card et al. 2004, Jerant et al. 2013);

2. The apparently ex-ante low moral hazard could be due to two compensating factors: a pure positive moral hazard (primary prevention decrease) and a decrease in incidence and prevalence of illnesses due to insurance-induced ex-post greater contact with medical professionals: this increases health promotion information and decreases the probability of illness (Dave and Kaestner 2006);

3. The EAMH, leading to decreases in prevention activity, can cause epidemics, such as obesity: the induced innovation hypothesis (Bhattacharrya-Packalen 2008) assumes that an increase in the incidence of a disease will increase technological innovation specific to that disease, lowering the adverse health effect of such epidemics.

4. Similar, although not explicitly linking EAMH and EPMH and leading to different conclusions, is the “dynamic ex-post moral hazard” hypothesis (Zweifel-Manning 2000): According to them: "Health insurance may affect the pace of innovation in two ways. First, the more expensive new service may reduce the effective price of care in subsequent illness episodes, and second, it may increase the importance of insurance in lowering total price, thus reinforcing moral hazard effects beyond the deductible. Since process innovation does not have these features, insurance coverage also biases the composition of innovation in favor of product innovation."

\(^1\) There is wide consensus on the limited extent of moral hazard in low price-elasticity hospital services and of an important effect in high price-elasticity ambulatory care and diagnostics (see Sapelli-Vial 2003).

\(^2\) See Lundin 2000

\(^3\) We exclude the pure fraud in reporting own health conditions in order to justify absence from work (see Núñez 2015)
Our hypothesis can be outlined thus: An insured individual, acknowledging that his/her bad health is due to having made scant health promotion effort in the past (EAMH), feels or is felt as "undeserving" and reduces the utilization of services (EPMH); conversely having exerted in the past an health promotion effort makes you feeling as "deserving" care. The straightforward consequence of this hypothesis is that there is an inverse relationship between ex-ante and ex-post moral hazard.

There is an extended psychological and sociological literature on what is called "stigma" and "nihilism"(see Special Issue of Social Science & Medicine: Stuber et. al. 2008). According to the taxonomy of Chambers et al. (2012), stigma means that: "society labels someone as tainted and less desirable on the basis of an attribute that marks them out as different", and this can lead to self-inflicted discrimination or to actual discrimination (i.e. discrimination faced outside). We call internal stigma the self-inflicted stigma, and external the stigma attributed by doctors or society. Discrimination may eventually lead to adverse health outcomes.

The study of Chambers et al.(2012) concludes: "This review suggests that health-related stigma is part of the lung cancer experience. Specifically, patients felt that negative social views about lung cancer being a self-inflicted disease with a mostly fatal outcome meant that treatment might be delayed or denied; and that seeking treatment was futile". In other words, the utilization of services (EPMH) by those having probably caused their illness because of EAMH (lung cancer seen as due to smoking) is less than the utilization by those not having a self-inflicted disease.

The three main channels suggested by the literature for such internal consumption restraint are: 1) the "widespread denial" (Phelan et al. 1992) a coping strategy especially found in cancer patients (Rabinowitz and Peirson 2006; Vos et al. 2008), whose effects on physical and psychosocial outcomes can have different directions (Vos et al. 2010, 2011); 2) "anticipated stigma": an important study in the field (Earnshaw and Quinn 2012), shows that individuals having received external stigma may anticipate further external stigma, thus accessing health care less (behavior equivalent to fear-induced internal stigma); 3) cultural factors as "stoicism" (Tod et al 2008) defined as not complaining and "putting a brave face on things".

On the other hand, EPMH is not just a minor violation, driven by the need to feel more "secure" (extra-consumption in order to have a confirmatory diagnosis or therapy); as shown by Einav et al. (2012), it can be a "premeditated" behavior, leading to a selection of health plans driven by our desire to "take advantage" of care. Of course, detecting ex-post moral hazard may be more difficult, but the history of past expenditure, given a specific illness or condition and its severity, is now easier thanks to electronic records.

The hypothesis of an inverse relationship between EAMH and EPMH implies that individuals responsible for ex-ante moral hazard, when facing an illness generated by their behaviour, may decide because of internal stigma, to compensate for this ethical violation with less ex-post moral hazard than others, consuming what is needed and no more. Adding external stigma to the internal one would mean discriminating among individuals nearly equally costly to the society: why should we prevent them, on ethical grounds, from consuming, on average, nearly the same amount that is consumed by individuals not having brought on their illness because of ex-ante moral hazard but showing, once ill, a high ex-post moral hazard that is equally unfair? Conversely, it is fair to reward those that have in the past made a relevant and successful effort to give up smoking if that effort leads them, once ill, to feel justified in requiring lot of services - even more than those utilized by people that never smoked - some of them partially or totally unneeded?

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4 For a similar notion of self-stigma or internalized stigma, as applied to patients with mental disorders see Adewuya et al. 2010, James-Kutty 2014. Moreover social support can be greatly beneficial to those that, according to Chou et al. 2013, have an history of addiction and of internalized stigma:"Findings suggest that social support mediates the negative impact of internalized stigma by facilitating the use of active coping behaviors"
An outline model

Assume that the use of health care service (HCC) \( j \) by individual \( i \) is determined by an objective component due to the illnesses and a subjective one, due to EPMH:

\[
HCC_{ji} = f[\text{Illn}_i(EAMH_i), EPMH_i(EAMH_i)]
\] ................................. 1.

with Illn\(_i\) = illnesses for the individual \( i \). Assuming additive separability, we have that:

\[
\frac{\partial HCC_{ji}}{\partial EAMH_i} = \frac{\partial HCC_{ji}}{\partial \text{Illn}_i} EAMH_i + \frac{\partial HCC_{ji}}{\partial EPMH_i} \text{EPMH}_i.
\]

The sign of the first term on the right hand side is of course positive, because an individual increases his/her probability of becoming ill if he/she chooses EAMH. By assumption, instead, the second term on the right hand side is negative since having had EAMH because of internal or external stigma decreases EPMH and utilization of services. The final sign of the relationship between service use and EAMH is then unknown, but possibly the two components could balance out.

Although it is not the task of our work to add further empirical proof of the effects of stigma and nihilism, it is worth considering how we could model their effect on health outcomes. We could utilize the framework proposed in Citoni (2015) to test for the existence of such an inverse relationship between ex-ante and ex-post moral hazard. The final equation to estimate, for each health care service \( j \), and forgetting about subscripts \( i \) for individuals, is:

\[
HCC = g*(\text{illnesses}) + g**(DC,LC) + (g**-h*)(EAMH) + g***((p_k-p_m)) + g****(w) + g******(\text{HE}_k-\text{HE}_m) + \epsilon
\] ................................. 2.

with: HCC = health care consumption, DC = demographic components (age, sex, etc.), LC = life components often experienced in the past, \( p \) = a vector of health services prices, \( p_k-p_m \) = difference between the price of the time-saving treatment \( k \) and that of a best-practice treatment \( m \), \( w \) = wages, \( \text{HE}_k-\text{HE}_m \) = distance between health after treatment \( k \) and after best-practice treatment \( m \).

In the above equation the parameter \( h^* \) should measure the psychological effect of self-restraint for smokers.

The Evidence

We performed an estimation of service utilization for smokers, non smokers and past smokers from equation 2. This empirical analysis does not address all the issues related to the cost of smoking and is given only as an attempt to show that the points raised do have some practical importance.

We use the microdata of Italian Survey on Health Conditions and Health Care Services Use (ISTAT 2014). The survey, made of more than 104000 individual records, has one limitation: it does not contain any information on infancy socio-economic background (information on parents of the interviewees). The LC component of the model is then approximate: we proxied the high social status of parents by their children’s achievement of high levels of education\(^5\). Moreover, we represented the last three variables of the model by a unique variable PAYNOTQU.

We estimated by zero inflated negative binomial regression (inflation factor self-reported health)\(^6\), and robust standard errors, the following equations:

\[
\text{NSERV}_j = a + b \text{AGE} + b1 \text{AGE}^2 + b2 \text{SEX} + b3 \text{i.} \text{REG} + b4 \text{EDU} + b5 \text{i.SMOKER} + b6 \text{i.COP} + b7 \text{ACILLN} + \sum_{i=1}^{23} c_i \text{CHILLN} + d \text{PAYNOTQU}............................................2b.
\]

\(^5\)In line with social mobility theory, that appears to be low in Italy (Checchi 1996).

\(^6\) Further estimation strategies have been attempted, such an hurdle model and a finite mixture model. Their results, summarized later on, are in line with those proposed, confirming the robustness of the results.
in which \( N_{SERV_j} \) = number of times the service \( j \) has been used (\( j=1,2 \), medical consultations in the last 4 weeks, diagnostics and other screenings in the last 4 weeks), \( AGE = \text{age (completed years)} \), \( AGE^2 = (AGE - \text{mean(AGE)})^2 \), \( SEX = \text{female} \), \( i.\text{REG} = \text{dummies for Italian regions (omitted Piemonte)} \), \( EDU = \text{dummy for upper secondary education or higher} \), \( i.SMOKER = 2 \text{ dummies: past smoker, never smoked (omitted smoker)} \), \( i.COP = 2 \text{ dummies for copayment exemption: total exemption, partial exemption (omitted full copayment)} \), \( ACILLN = \text{having had acute illnesses in the past 4 weeks} \), \( CHILLN = 23 \text{ dummies for 23 different chronic conditions} \), \( PAYNOTQU = \text{a dummy scoring one for those that have preferred to pay fully the consultation in order not to queue/wait for receiving it} \).

With respect to the theoretical approach, represented by equation 2., the variables \( ACILLN \) and \( CHILLN \) represent illnesses, \( AGE, AGE^2, SEX, i.\text{REG} \), represent demographic conditions (DC) and even a control for different regional supply of services, the variable \( EDU \) is taken to proxy life conditions/circumstances (LC), the EAMH/effort is captured by the two dummies \( i.SMOKER \), the price of the services (\( p \)) is represented by exemption status \( i.COP \), and finally the time component of moral hazard (TC), being impossible to include the adverse health effect of non best-practice choices (\( HE_k-HE_m \)), is only represented by \( PAYNOTQU \) variable, capturing the fact that individuals make a choice more costly (and possibly sub-optimal) in order to save time.

The main results are summarized in Table 1:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past smoker</td>
<td>.1536165***</td>
</tr>
<tr>
<td>Never smoked</td>
<td>.0334758**</td>
</tr>
</tbody>
</table>

The average effects (predicted number of consultations, screenings) for the smoking status are as such:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current smoker</td>
<td>.6062866***</td>
</tr>
<tr>
<td>Past smoker</td>
<td>.7070608***</td>
</tr>
<tr>
<td>Never smoked</td>
<td>.626926***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current smoker</td>
<td>.3363345***</td>
</tr>
<tr>
<td>Past smoker</td>
<td>.3921808***</td>
</tr>
<tr>
<td>Never smoked</td>
<td>.3461082***</td>
</tr>
</tbody>
</table>

Our tentative results confirm the theory, at least for medical consultations and for screenings. The psychological effect is mostly significant and the sign of coefficient is as expected, though an asymmetry is also evident. Having exerted in the past an effort to reduce EAMH leads to more consumption, while a smoker may consume less than a non smoker or quite the same.
The marginal effects, moreover, show that the magnitude of the effect is non negligible: past smokers, in average, make 0.1 more visits and about 0.05 more screenings in a 4 week period than smokers.

A point that sheds light on the voluntary or constrained effect of reduced consumption for smokers comes from the analysis of marginal effect of past smokers and of individuals that never smoked: the more the effort you did in the past (quitting smoke) the more you feel deserving care and the more you abuse of services. This seems to be a pure voluntary effect (why doctors should encourage the consumption of past smokers more than that of people that never smoked?).

Moreover, past smokers, according to psychology, are individuals with an internal locus of control or higher self-efficacy, that in the past permitted them to quit smoking: this may explain their self-centeredness in the process of care and their possible overconsumption.

As robustness checks, we utilized both a different estimation approach and a different specification of the variable representing the number of visits. Two alternative estimation methods were used on the aggregate number of visits: 1) an hurdle approach, with a logistic equation for the probability of utilization and both a zero truncated binomial and Poisson for the number of visits: the results are confirmed for smokers just for the different probability of utilization (not for the number of visits, where coefficients tend to lose significance); 2) a two components finite-mixture Poisson, obtaining the existence and significance of the two components\(^7\), and a mixed evidence for smokers: full confirmation of both effects for the first component, while for the second component the difference between smokers and non smokers fades away\(^8\).

In order to find a reason for the two different distributions of finite-mixture model, we tried two different specifications of the number of visits: 1) the first splits the total number of visits in a component due to "medical need", defined as visits attended because of illnesses or symptoms, and the other due to "other needs" such as prescriptions for drugs/analysis, certifications, etc.: we obtain that the effect for smokers has to be qualified, being there for the visits needed for other reasons, and disappearing just between smokers and non-smokers if visits were needed for medical reasons; 2) the total number of visits was split in visits with GPs and specialists' visits: the results, as above are entirely confirmed for GP visits, while for visits with specialists the difference between smokers and non-smokers seems to lose significance.

We conclude that the psychological effect is always there between past-smokers and the other two groups, but that, between smokers and non-smokers it takes more the form of smokers' reduced probability to access to GPs' visits needed for "asymptomatic" reasons.

As a further check, in order to address the issue of a selection bias - due to the fact that surviving smokers are the strongest among smokers (then consuming less than the others, even after controlling for all the illnesses), and past smokers are the weakest (having quitted smoking because of an illness) thus consuming more than others - we created a categorical variable assuming the value of 1 for non-smokers, 2 for "light smokers", those that have smoked in their entire life up to 50000 cigarettes (say about 5 cigarettes a day for about 27 years), 3 for "heavy smokers", having smoked in their life more than 50000 cigarettes, 4 for those smoking cigars, pipe, etc., 5 for past smokers that gave up smoking at least 10 years before the interview, 6 for past smokers that quit in the 10 recent years.

The results are summarized, for visits and exams, in the following Table 2 (omitted non-smokers):

<table>
<thead>
<tr>
<th>Medical consultations in the last 4 weeks</th>
<th>Summary statistics: Number of observations 104086 (33875 non-zero, 70211 zero), Wald chi²(68) = 14494.87***, Both the zero inflation factor and the extra-dispersion parameter are highly significant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
</tr>
</tbody>
</table>

\(^7\) Though the goodness of fit is lower than for the zero-inflated negative binomial method

\(^8\) Still remaining that between smokers and past-smokers.
Current light smoker (cigarettes)  
-0.0287943

Current heavy smoker (cigarettes)  
-0.0384347**

Current smoker (other)  
0.1904566

Past smoker (quit up to 10 years ago)  
0.1498636***

Past smokers (quit more than 10 years ago)  
0.1023895***

Diagnostics, other screenings in the last 4 weeks

Summary statistics: Number of observations 104086 (13934 non-zero, 90152 zero), Wald chi2(68) = 1131.62***, Both the zero inflation factor and the extra-dispersion parameter are highly significant,

Current light smoker (cigarettes)  
0.0287771

Current heavy smoker (cigarettes)  
-0.0486941*

Current smoker (other)  
0.1019411

Past smoker (quit up to 10 years ago)  
0.1757528***

Past smokers (quit more than 10 years ago)  
0.0906896***

The excess consumption of past smokers, having them quitting recently or not, thus independently of the bad health as a reason for quitting, is always important in magnitude and significant. There is instead only a small flavour of reduced consumption for heavy smokers, mainly limited to doctors' consultations: we cannot rule out that heavy smokers are stronger than the others, consuming less even after controlling for illnesses, even if we prefer as explanations of their underconsumption the denial, the anticipated stigma and the stoicism.

Implications

Smoking initiation has been extensively studied: the relevance of social class, peers and family has been reviewed, confirming that there could be but a weak "responsibility" in the decision to start smoking; our hypothesis adds that the consequences of smoking behavior on service consumption are possibly countered by the smokers themselves and by doctors and society (stigma). The global extent of smokers' responsibility should thus been considered negligible. Contrary to this line of reasoning we could extrapolate from the literature a "direct" relationship between EAMH and EPMH, leading to a reinforcement of responsibility. In fact, De Preux (2012) affirms that there is an anticipatory behaviour in EAMH: individuals know that it will take time for the adverse health consequences of risky behaviours to come about, and start to behave badly well before deciding to get insured. If we add to this behaviour of the above-mentioned "premeditated" choice of health plans that permits greater EPMH (Einav et al. 2012), and we assume that the same individuals having anticipated the effects of EAMH choose plans that guarantee more EPMH, we end up with a "double responsibility" effect (there is a problem of identification here because EPMH is indistinguishable from the "health consequences" of EAMH).

What is really interesting, though, is the behavior of past-smokers. The probability of quitting may be influenced by a number of factors: their importance is either contingent, in that they fade away after the successful quit, or permanent, being intrinsic characteristics of individuals or of their social environment. We are mainly interested in the latter, being those that could explain a permanent, rather than transitory, overconsumption of health services.

The differences among college students between the groups of nonsmokers, past smokers and current smokers have been analyzed in a study: their differences boil down to behavioural factors, attitudes factors, value factors and interpersonal factors. The first difference is that former smokers show an

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9 For example a history of major depression is associated to less likelihood of quitting (Glassman et al. 1990)

10 See Berg et al. 2012
intermediate propensity to have bad consumption habits (binge drinking\textsuperscript{11}), between current smokers (highest propensity) and non-smokers (lowest).

The above risk factor may increase the prevalence of diseases in an independent or a synergic way.

Regarding to attitudes, former smokers show attitudes toward smoking more tolerant than non-smokers but less than smokers.

The third has something to do with hope: formers smokers have the highest level of hope, measured according to the Hope Scale (Snyder et al. 1996). This is coherent\textsuperscript{12} with our view that the excess consumption of those that have successfully reduced their EAMH in the past, may be due to a difference respect to those that continue to smoke, having probably an internal locus of control\textsuperscript{13}, implying that they feel to deserve an extrinsic reward in the form of EPMH.

The final social difference relates smokers and former smokers to peers and parents: smokers are more likely to live with other smokers, and had more friends who smoked.

The main implication of the paper is on the theory of equity in health and health care. Our findings suggest that Inequality of Opportunity theory (IO) should be revised both in its theoretical underpinnings and in its empirical application\textsuperscript{14}. From the theoretical point of view, either we should not sanction the lack of effort due to EAMH, or, together with EAMH, we should also sanction EPMH, consisting in a lack of effort today: if the latter option is chosen, an appropriate discount factor should be found to compare the consequences of lack of effort occurring in different times. From the empirical point of view, there is no evidence for the hypothesis - usually made to circumvent the problem of unobservable effort (Rosa Dias 2009) - that health outcomes are monotonically increasing in effort, such that effort becomes the residual determinant of health, once the "types of individuals sharing the same circumstances" are fixed. As we have shown, health status emerges as a consequence both of lack of effort ex-ante (EAMH) and of health production technology (EPMH): low outcomes for smokers, then, could be imputed both to excess risk from lack of effort (high EAMH) and to stigma and nihilism amounting to "unjustified" discrimination (low EPMH), while better outcomes for non-smokers could be due more to excess expenditure (high EPMH) than to risk-reducing effort (low EAMH).

In a companion paper (Citoni 2015) we tried to assess theoretically which is the bias introduced by IO measurement if there is not any correction for the inverse relationship between ex-ante and ex-post moral hazard and if the measure is used for comparisons among social classes. We argued that the EPMH bias is not independent from social class belonging, because the usual price effect on moral hazard is obviously in favor of the poor (given the copayments exemptions accorded to them in a NHS) while the psychological\textsuperscript{15} and the time effects are pro-rich. We can now test - in an approximate way and for the specific case of Italian NHS - its magnitude, estimating the number of general practitioner and specialists consultations. We first compute a prediction (P1) of the number of consultations using the general model 2b: by sterilizing\textsuperscript{16} the effects of the price variable (COP), of smoke variable (SMOKER) and of time variable (PAYNOTQU) we

\textsuperscript{11}They instead seem to be the lowest consumers of fat food

\textsuperscript{12}Hope theory posits that hopeful people have agency and pathways to reach goals. For example one agency item is “At the present time, I am energetically pursuing my goals,” and one pathways item is “If I should find myself in a jam, I could think of many ways to get out of it.”

\textsuperscript{13}No significant difference in the Rotter scale is found, though, between smokers, past smokers and non-smokers by Burgess-Hamblett (1994). See also Norman-Bennet (1995)

\textsuperscript{14}We have dealt with in Citoni 2015

\textsuperscript{15}A paper (Graham 2012) stresses the importance of considering social classes when dealing with stigma against smokers: "... class provides an essential analytic lens through which to understand the stigma of smoking and the stigmatising impacts of tobacco control policies”.

\textsuperscript{16}We set the values of the variables to sterilize to zero, and we make predictions, using the estimated coefficients of the full specification 2b
get a number of predicted consultations (P2), net of EPMH, which is lower than the full model prediction. We computed the ratio P2/P1 and we applied the STATA test (equality of two subgroups means) to the groups of rich and poor\textsuperscript{17}: the ratio is higher for the rich, pointing to a lower EPMH and the test is significant\textsuperscript{18}. We conclude that, being EPMH globally pro poor\textsuperscript{19}, the persistence of inequalities in health due to adverse circumstances in childhood for the poor, is somewhat mitigated, so that the measure is sufficiently acceptable for social-class comparisons.

A second implication is more practical, having to do with the estimated cost for insurances of smokers and past-smokers. We suggest that, given their EPMH, past smokers should be treated by insurances as a risky group, as they do for smokers themselves: their reduction in EAMH - assuming to equalize their health risk to that of non smokers - may generate savings of 10% as Kaplan et al. (2014) show, but is exactly compensated by a 10% increase in ex-post moral hazard. We wonder if ACA could endorse such a nasty policy of rates fixation\textsuperscript{20}.

Conclusions
Our tentative empirical analysis suggests that\textsuperscript{21}, under the \textit{ceteris paribus} clause with regard to health conditions, smokers may utilize fewer services than non-smokers and that past smokers consume more than both smokers and non-smokers. This evidence, limited to a single country and a single time, implies that smokers’ EPMH may be slightly less than that of non-smokers, both because there is an internal censoring effect and because there is an external stigma and discrimination, though for the extra-consumption of past-smokers, a part is probably due to the fact that they have quit recently because of an illness requiring heavy use of services, and the remaining part to the plausible behavioral hypothesis that they feel to \textit{deserve} more care because of their past effort to quit and because they have an internal locus of control.

The analysis could be improved in several respects. First, we have proxied the price effects on consumption by copayments exemptions; this is justified in our case because the study utilizes data for Italy, which has a regionalized National Health Service, with limited coinsurance rates (extended copayments, coupled with income and pathology exemptions, are utilized only for specialists’ consultations and for diagnostic exams and other screenings\textsuperscript{22}): EPMH can be reduced, in such a system, by copayments, by the gate-keeping activity of GPs, and by self-inflicted stigma. It could be interesting to utilize cross-country data to see if the above findings are robust across different health system types. Especially relevant would be application to the US health care system, based on private insurance.

Second, we are not able to confirm that the global amount of excess consumption for smokers is moderate, because we have not been able to model the impact of EAMH on the increased risk of illnesses for lack of

\textsuperscript{17} Defining rich those answering "good" and "fair" to a question on household income, while poor is considered the individual answering "poor" and "very poor".
\textsuperscript{18} The two values for the rich and the poor and for the total number of consultations are respectively 0.8815043 and 0.8648123, and the ttest value \( t = -17.1948 \) is significant at a level < 1%
\textsuperscript{19} Implying: COP effect (SMOKER+PAYNOTQU) effects
\textsuperscript{20} This is not to say that quitting smoke is a bad or an irrelevant thing in itself: the reduction of illnesses and deaths has a value not considered here. Moreover former smokers may improve, in the medium run, after the withdrawal period, their well-being (less stress, less craving, less anger/restlessness; see Schlam et al. 2012). We question that this behavior may be cost-saving for consultations and screenings.
\textsuperscript{21} No causality link can be established, being the regression approach able to show only an association between smoking/past-smoking behaviours and health care consumption.
\textsuperscript{22} Copayments for drugs have a complex structure (regionalized, limited to specific drugs, linked to reference prices, etc.). We have not considered drugs use.
data (cancer is an aggregate chronic condition and lung cancer cannot be disentangled): in fact, a cross section is not suitable to deal with the excess mortality of smokers, who drop out from the sample.

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References


