Camouflage and Ballooning in Health Insurance: Evidence from Abortion

Annette Hofmann · Julia K. Neumann · Peter Zweifel

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Abstract This study provides both a behavioral model and empirical evidence on camouflage and ballooning, two well-known but little researched issues in health insurance. The analysis differs from existing literature in that individual search effort for abortion or camouflage is explicitly modeled. Theoretical predictions are confirmed to a considerable degree using Swiss health insurance data: first, a significant share of abortions is camouflaged by contrived medical coding, and second, strict cantons export the problem to more liberal ones resulting in ballooning. The analysis implies a difficult trade-off for policy: to curtail *abortion tourism*, the cantons would have to be mandated to implement the pertinent federal regulation in the same way; however, this would neglect important regional differences.

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Annette Hofmann* (corresponding author), School of Risk Management, Insurance, and Actuarial Science, Peter J. Tobin College of Business, St. John's University, 101 Astor Place, New York, USA. *hofmanna@stjohns.edu*

Julia Neumann, University of Hamburg, Institute for Risk and Insurance, Von-Melle-Park 5, 20146 Hamburg, Germany. *julia.neumann@uni-hamburg.de*

Peter Zweifel, University of Zurich, Kreuth 371, 9531 Bad Bleiberg, Austria.
Peter.Zweifel@uzh.ch

Highlights:

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2. Theoretical predictions are confirmed to a considerable degree using Swiss health insurance data: First, a significant share of abortions is camouflaged by contrived medical coding, and second, strict cantons export the problem to more liberal ones resulting in ballooning.

3. The analysis implies a difficult trade-off for policy: to curtail "abortion tourism", the cantons would have to be mandated to implement the pertinent federal regulation in the same way; however, this would neglect considerable regional differences in preferences.

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1 Introduction

Abortion is at the crossroads of the economics of health, family, and crime - apart from major ethical issues which will not be considered here. Health economics is involved because a woman considering abortion puts her health at risk unless she seeks help from a trained professional, in which case she also incurs some healthcare expenditure. There is a connection with the economics of the family since abortion is one way to bring the actual number of children in line with the desired one. In many countries, abortion continues to constitute a crime, at the vary least if performed after a certain time limit (which is usually twelve weeks into pregnancy) and without the necessary legal prerequisites. International comparisons have been used to cast light on the relative importance of these three aspects.

This study relates abortions to two phenomena known from health insurance, camouflage and ballooning, using evidence from Switzerland.[1] This country is of particular interest because its jurisdictions (cantons) often implement federal legislation with notable variation, in keeping with regional preferences. In the case of the federal law of 2002 regulation abortion, this has two consequences: especially in strict cantons, a (significant) share of abortions is camouflaged by contrived medical coding. Second, there is ballooning in that strict cantons tend to export the problem to more liberal ones.

The present analysis differs from the existing literature in that it explicitly models the search effort of an individual seeking a health service, i.e., an abortion, possibly combined with camouflage. Predictions derived from the model are tested using more than 80,000 individual health insurance records. Such a within-country analysis has the considerable advantage of unified recording, whereas international data tend to suffer from measurement errors caused by reporting differences. In countries where abortion is illegal except under narrowly defined circumstances, the discrepancies between actual and reported figures are particularly large. In Switzerland, abortions are permitted under certain circumstances, but every abortion has to be reported for statistical purposes to the competent health authority. The data indicate whether an abortion is performed in the canton of residence or in another canton (but still within the same country). This unique data set permits to answer three major research questions:

Q1 To what extent is a more strict implementation of the abortion law (by a canton) associated with a decrease in the rate of abortion recorded by the health insurer, ceteris paribus?

Q2 To what extent is such a recorded decrease associated with an increase in camouflaged abortions?

[1] Camouflage is one type of miscoding in health insurance. Another important type of miscoding is upcoding (see, for instance, Silverman and Skinner (2004) , Steinbusch et al. (2007), or Dafny and Dranove (2009).

Q3 To what extent is such a recorded decrease in a canton associated with exporting an abortion to another canton?

These three questions clearly are of relevance to many countries. An answer to Q1 informs international policymakers what to expect from variations in the de facto stringency of abortion regulation, holding other determinants constant. An answer to Q2 provides an indication of the extent that policy initiatives may impact on the true rather than the officially recorded rate of abortion. Finally, answering Q3 permits to estimate the extent to which countries with a strict stance on abortion might export the problem to others (with intercantonal ballooning in Switzerland certainly presenting an upper bound due to the small size of the country and insurance coverage valid at the federal level).

This study is structured as follows. Section 2 discusses previous research. In Section 3, the decision-making process of a woman seeking out a suitable physician is explicitly modeled. The woman seeks a physician who is willing to endorse her abortion and possibly to camouflage it. Conditional risk utility functions are used to extend the approach by Dionne and St-Michel (1991). Section 4 provides a short overview of abortion legislation in Switzerland. Testable hypotheses derived from the microeconomic model are juxtaposed to the data in Section 5. The last section discusses results, policy implications, and conclude.

2 Previous Research

The study of abortion has a long history. Some reasons for aborting have changed over time while others have remained important. According to Caron (2009), most of the abortions in the state of Rhode Island between 1876 and 1938 were conducted by single women in their twenties. Their two main motivations were that they were either not married and feared a loss of reputation or their lover was married to another woman. In contrast, the abortion decision of married women was primarily driven by economic factors, extramarital affairs, or a strong preference for limiting the number of children.

Even if the social and economic situation of women has improved during the last century, the debate about the legal status of abortion has continued, with a strong influence of religion and ethics. Moreover, abortion is still economically very relevant for many families. Several studies have tried to investigate the determinants of the demand for abortion. The classical one-good demand approach was pursued by Medoff (1988), who used an economic model of fertility control to estimate the demand for abortions in the United States. His results show that abortion is a normal good, with an income elasticity of demand of 0.79 and a price elasticity of -0.81. Being unmarried and

employed increases the demand for abortion. Interestingly, catholic religion, the level of education, and the poverty status of a woman do not seem to affect abortion decisions.

Previous research focuses mainly on U.S. data. For instance, Cook et al. (1999) estimate the effects of funding termination on the monthly abortion and birth rates in North Carolina. Using U.S. data on abortion rates between 1974 and 1988, Blank et al. (1996) analyze the effect of restrictions on Medicaid funding of abortion, finding stringency of funding lowers in-state abortion rates while increasing them in neighboring states (reflecting also cost of search). According to their estimates, 19-25 percent of low-income women would not have aborted if Medicaid funding was eliminated. Furthermore, parental notification laws were found not to affect abortion rates. The authors also find rates to be positively related to the number of in-state abortion providers (which may reflect cost of search, an aspect emphasized in Section 3 below). They argue that this positive correlation reflects *abortion tourism*. Joyce and Kaestner (1996) study whether laws that require minors to notify or obtain consent from a parent before receiving an abortion affect the likelihood that a pregnancy will be terminated. They find a low impact of parental involvement laws on the pregnancy resolution of minors. Jewell and Brown (2000) investigate the responsiveness of abortion demand to the availability of abortion providers for teenage women, who differ from older ones in their decision-making regarding abortion. Their results suggest that abortion rates of teenagers aged between 13 and 17 take the cost of travel into account when deciding to give birth to the child or to abort. They conclude that the greater the distance to be traveled to obtain abortion within the county, the lower the abortion rates per woman and per pregnancy. An interesting result is that a lower provider density has more impact on all women of childbearing age (15-44) than on teenage women.

More recently, abortion has been analyzed in a multiple-goods context. Specifically, Wiecko and Gau (2008) investigate why people may support the anti-abortion movement while advocating death penalty. They find that biblical literalism explains this contradiction best. In areas with a high density of Christians taking the Bible as the word of God, lower abortion rates prevail, making religion an important determinant in their analysis. Contrary to Medoff (1988), Adamczyk (2008) takes into account individual, contextual, and structural factors when trying to explain the decision-making by women regarding an abortion in the premarital phase of their lives. Her focus is on academic aspirations and structural constraints in contrast to the religious context. She finds that the likelihood of aborting does increase with identification with a conservative Protestant denomination, but also academic ambition, proximity to an abortion clinic, and the level of public abortion funding in the county of residence. However, her results agree with the findings of Blank et al. (1996) and Medoff (1988) in that economic factors have a major impact.

This study extends the literature in two ways. On the one hand, it puts explicit emphasis on a woman's search effort for a suitable physician to perform the abortion. Not only does individual search effort result in a higher probability of a physician issuing the medical certificate legalizing

abortion, but it also increases the chance of having it camouflaged in the medical record. Camouflage is reinforced by having the abortion performed away from one's community of residence; in the case of Switzerland, this typically is a canton with a more liberal policy, giving rise to *abortion tourism*.

3 The Model

3.1 Conditional Risk Utility Functions and First-Order-Conditions

The model is in the spirit of Dionne and St-Michel (1991), who consider a worker searching for a physician in order to obtain a paid short-term disability leave. They distinguish two disease categories, one easily verifiable, the other hardly verifiable. In the present model, the physician not only decides about coding an abortion truthfully or camouflaging it but also about performing it or delegating it to a colleague (usually outside the canton). Through her search effort, the woman interested in an abortion thus does not only increase her chance of a physician consenting in principle but also performing it rather than sending her to a colleague. Therefore three states need to be distinguished: no abortion (n), disclosure given abortion (d), and camouflage given abortion (c).

Assuming that a representative woman is a risk-averse person, she will maximize her expected (von Neumann-Morgenstern) utility ($v(\cdot)$, with $v' > 0$ and $v'' < 0$). Accordingly, her decision-making problem is to maximize

$$\begin{aligned} EU(e) = {} & \rho(e) \cdot v_n\{\overline{W} - C(e) - M_n\} \\ & + (1 - \rho(e)) \cdot [\sigma(e) \cdot v_d\{\overline{W} - C(e) - M_d\} + (1 - \sigma(e)) \cdot v_c\{\overline{W} - C(e) - M_c\}], \end{aligned} \tag{1}$$

where her decision variable is effort e, with cost $C(e)$ whose marginal cost C' is constant for simplicity ($C'' = 0$).[2] With a probability that depends negatively on her effort ($\rho' < 0$, $\rho'' > 0$), she fails to find a physician, and her wealth amounts to $\overline{W} - C(e) - M_n$, since contacting a physician inevitably gives rise to a bill and hence involves a (small) copayment which is denoted by M_n. However, with probability $(1 - \rho)$, she finds a physician who is willing to endorse the abortion and possibly to perform it. Effort e also influences the conditional probability σ of the physician disclosing the procedure through the appropriate coding of the diagnosis, again with $\sigma' < 0$ and $\sigma'' > 0$.

To reflect the fact that it takes more search effort (marginal effectiveness is lower) to find a physician who is willing to camouflage an abortion than one who just testifies its necessity (without performing it), we assume $\sigma' < \rho'$ in absolute value. This is illustrated in Figure 1. Resulting wealth amounts

[2] Note that this does not entail a loss of generality since the marginal effectiveness of effort is decreasing in e ($\rho' < 0, \sigma' < 0$).

to $\overline{W} - C(e) - M_d$ because health insurance again makes the woman bear a copayment $M_d > M_n$. This outcome is valued according to the risk utility function $v_d(\cdot)$. However, with probability $(1-\sigma)$, she succeeds in finding a physician who not only issues the medical confirmation but is also willing to camouflage the procedure (which according to the insurer's experience is indicative of his or her also performing the abortion). Final wealth is then given by $\overline{W} - C(e) - M_c$, with $M_c > M_d$ for at least two reasons. First, it is easy for the camouflaging physician to load the billing by coding a lot of procedures, serving to increase payment received (the great majority of them operate under fee for service). Second, camouflaging requires referral to a private clinic because referral to a physician working in a public hospital would very likely result in disclosure. However, even if the woman has complementary health insurance coverage for accommodation in a private hospital, she still has to come up with a copayment that exceeds the one associated with a stay in a public ward.

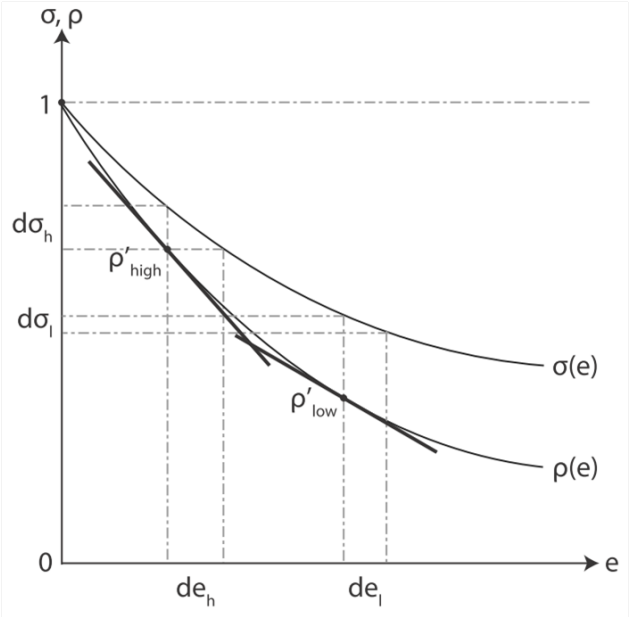

Figure 1 Marginal effectiveness of search effort

The woman's decision-making situation can be illustrated as follows. Clearly, not obtaining an abortion comes close to suffering a loss of quality of life (and potentially, health). It therefore amounts to losing an irreplaceable asset in the sense of Cook and Graham (1977). Three possible conditional risk utility functions are shown in Figure 2. For a woman seeking an abortion, obtaining it secretly is the best possible option. For this reason, $v_c(W)$ runs highest. The second-best option is obtaining the abortion, but with disclosure. Accordingly, $v_d(W)$ runs second highest. The issue now becomes the marginal utility of risky wealth in the two states. Following the argument by Eeckhoudt and Schlesinger (2006) that risk-averse decision-makers seek to avoid the accumulation of losses (because this would cause a particularly high loss of utility), the difference between $v_c(W)$ and $v_d(W)$ must be particularly marked when wealth happens to be low. This would be the case

when the woman must accept disclosure while at the same time bearing the cost of search and copayment that goes along with the treatment. This implies that the marginal utility in the state of disclosure must exceed the marginal utility in the state of camouflage. The third state is the one of failing to obtain the abortion. Clearly, the pertinent function $v_n(W)$ must run lowest. In addition, this presumably constitutes the accumulation of losses (in terms of copayment and failure to obtain the abortion) that a risk-averse individual would want to avoid the most. Accordingly, the marginal utility of risky wealth must be highest in this state (as shown in Figure 2).

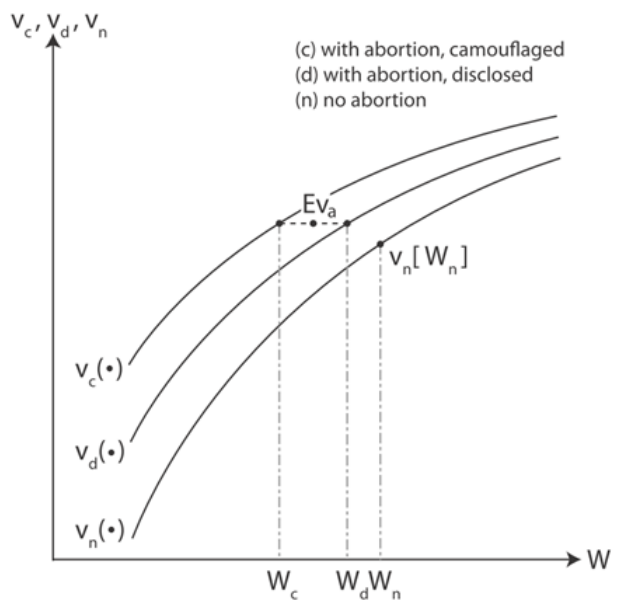

Figure 2 Conditional risk utility functions

The first-order condition for an interior optimum reads,

$$\begin{aligned}\frac{dEU}{de} &= \rho' v_n[W_n] + \rho v_n'[W_n](-C') - \rho'\{\sigma v_d[W_d] + (1-\sigma)v_c[W_c]\} \\ &+ (1-\rho)\{\sigma' v_d[W_d] + \sigma v_d'[W_d](-C') - \sigma' v_c[W_c] + (1-\sigma)v_c'[W_c](-C')\} = 0.\end{aligned} \tag{2}$$

Introducing $Ev_a := \sigma v_d[W_d] + (1-\sigma)v_c[W_c]$ for expected utility of risky wealth in the *abortion* state, one obtains

$$\begin{aligned}\frac{dEU}{de} &= -\rho'\{Ev_a - v_n[W_n]\} - \rho v_n'[W_n]C' - \sigma'(1-\rho)\{v_c[W_c] - v_d[W_d]\} \\ &- C'(1-\rho)\{\sigma v_d'[W_d] + (1-\sigma)v_c'[W_c]\} = 0.\end{aligned} \tag{3}$$

In full analogy, let $Ev'_a := \sigma v'_d[W_d] + (1-\sigma)v'_c[W_c]$ symbolize expected marginal utility in the abortion state. Thus, Eq. 3 can be written as

$$\begin{aligned}\frac{dEU}{de} &= -\rho'\{Ev_a - v_n[W_n]\} - \sigma'(1-\rho)\{v_c[W_c] - v_d[W_d]\} \\ &\quad - C'\{\rho v'_n[W_n] - (1-\rho)Ev'_a\} = 0.\end{aligned} \tag{4}$$

The first term denotes one component of the marginal benefit of additional search effort. It is due to the reduction in the probability of foregoing the expected gain in utility thanks to obtaining the abortion. Neglecting the cost of effort for the moment, there is such a gain if $Ev_a > v_n(W_n)$ for all possible values of $\{\rho, \sigma\}$ and hence effort e. This means that the differences in wealth levels $\{W_c, W_d, W_n\}$ must be relatively small (which is also shown in Figure 2). This in turn requires the differences in copayments $\{M_c, M_d, M_n\}$ to be small, as well which is the case because an abortion puts the insured woman beyond most annual deductibles (which range from a mandatory minimum of CHF 300 to a rarely chosen CHF 2,500; 1CHF=0.8 US$ at 2013 exchange rate), subjecting her to a copayment of only 10 percent on the excess over the deductible.

The second term of Eq. (4) denotes the other component of the marginal benefit of search effort. It again hinges on the reduced likelihood [given that abortion is granted, which has probability $(1-\rho)$] of foregoing the utility gain associated with having the abortion camouflaged rather than disclosed. Here, the differences in wealth levels $\{W_c, W_d\}$ and hence copayments $\{M_c, M_d\}$ must be small for this to attain. This condition is satisfied for the reason just given.

The third term of Eq. (4) symbolizes the marginal cost of effort in utility terms. Thus, the extra cost in money terms C' is valued using the probability-weighted marginal utility of risky wealth in the state *no abortion* and *abortion*, respectively, the latter being itself an expected value defined over the probability-weighted marginal utility of the abortion states *camouflage* and *disclosure*.

3.2 Model Predictions

Denote $A := \{Ev_a - v_n[W_n]\}$ as the expected benefit from performing the abortion. While not directly observable, it typically first increases and then decreases with age (say, beyond age 28) because of the desire to complete one's education and establish a career. Also, A should increase with the number of children already present and be higher for unmarried compared to married women. Finally, it depends on the magnitude of risk aversion since strongly risk-averse individuals suffer most from an accumulation of losses (Eeckhoudt and Schlesinger (2006); see the risk utility functions in Figure 2 again).

Since the first-order condition $dEU/de = 0$ must be satisfied prior and after a change dA, the comparative static equation reads

$$\frac{\partial^2 EU}{\partial e^2} de + \frac{\partial^2 EU}{\partial e \partial A} dA = 0. \tag{5}$$

Solving for de/dA and assuming the sufficient condition for a maximum $\partial^2 EU/\partial e^2 < 0$ to be satisfied, one obtains

$$\operatorname{sgn}\left[\frac{de}{dA}\right] = \operatorname{sgn}\left[\frac{\partial^2 EU}{\partial e \partial A}\right]. \tag{6}$$

Now let the change $dA > 0$ come about not through a change in wealth levels but through an upward shift in the conditional risk utility function (the irreplaceable asset is worth more). This means that the second and third terms of Eq. (4), among them in particular Ev'_a, are mildly affected. As an approximation, the mixed derivative therefore boils down to

$$\frac{\partial^2 EU}{\partial e \partial A} = -\rho' > 0 \rightarrow \frac{de}{dA} > 0. \tag{7}$$

As should be be expected, search effort is predicted to increase. Note that for an exogenous change $d\alpha$ such that $\partial\rho/\partial\alpha > 0$,[3]

$$\operatorname{sgn}\left[\frac{d}{d\alpha}\left(\frac{de}{dA}\right)\right] = \operatorname{sgn}\left[\frac{\partial}{\partial e}\left(\frac{de}{dA}\right)\frac{de}{d\alpha}\right] = \operatorname{sgn}\left[-\rho''\frac{1}{\rho'}\frac{de}{d\alpha}\right]. \tag{8}$$

While the sign of Eq. (8) is ambiguous due to $de/d\alpha \lesseqgtr 0$, the initial value of ρ matters because the marginal effectiveness of effort ρ' is high if ρ is high reflecting strict enforcement by the canton of residence (i.e., the chance of finding a physician willing to endorse the abortion is low initially). Conversely, ρ' is low if ρ is low initially (see Figure 1). Moreover, a given additional effort carries over to the probability of disclosure σ, albeit to a lesser extent because marginal effectiveness σ' is comparatively low (see Figure 1). This leads to a first prediction of the model:

Prediction 1. *Highly risk-averse women who derive a particularly high benefit from an abortion (establishing their career, already with children, unmarried) undertake more search effort than others, resulting in a higher likelihood of abortion and (to a lesser extent) of camouflage. Both effects depend on the likelihood of a physician refusing to endorse the abortion and hence the stringency of the canton.*

[3] Note that since ρ is endogenous, a variation without changing e is not possible ($\rightarrow d\alpha$ can be interpreted as an exogenous shift in the function $\rho(e)$).

This prediction is closely related to research question Q1. From Eq. (8), one can see that $\text{sgn}[d/d\alpha\{de/dA\}] = \text{sgn}[d/dA\{de/d\alpha\}] > 0$ for continuous functions. Therefore, while a strict enforcement of federal abortion legislation may discourage women from seeking an abortion ($de/d\alpha < 0$), it is less effective with those who see a high benefit in it.

The second prediction derives from the second term of Eq. (4), $-\sigma'(1-\rho)D$, with $D := \{v_c[W_c] - v_d[W_d]\}$. The term D reflects the benefit from having a camouflaged rather than a disclosed abortion. As argued towards the end of Section 3.1, D is dominated by the vertical distance between v_c and v_d, which implies that the magnitude of risk aversion is again decisive. Finally, D is high in strict cantons, which typically are characterized by a high degree of social control (see Section 4). In sum, a change $dD > 0$ thus mainly reflects an upward shift of the pertinent risk utility function, leaving wealth levels and Ev_a' approximately unchanged. Performing the comparative statics in full analogy to Eqs. (5) and (6), the expression of interest is

$$\frac{\partial^2 EU}{\partial e \partial D} = -\rho' \frac{\partial E v_a}{\partial D} - \sigma'(1-\rho) > 0 \rightarrow \frac{de}{dD} > \frac{de}{dA} > 0. \tag{9}$$

Therefore, search effort is predicted to increase when the benefit from camouflaging abortion is higher. As in Eq. (7), the marginal effectiveness of search in terms of finding an endorsing physician (ρ') enters. Moreover, the shift $\partial E v_a / \partial D$ must be of the same magnitude as the effect of a change dA considered above except for the fact that $dA > 0$ may also be the consequence of a change in $v_n[W_n]$. The second term involves $-\sigma'$, which is positive as well. Therefore, the total effect of a change dD almost certainly exceeds that of an equivalent change dA. Finally, note that the sign of the derivative of Eq. (9) w.r.t. α is given by

$$\text{sgn}\left[\frac{d}{d\alpha}\left(\frac{de}{dD}\right)\right] = \text{sgn}\left[\frac{\partial}{\partial e}\left(\frac{de}{dD}\right)\frac{de}{d\alpha}\right] = \text{sgn}\left[\left(-\rho'' \frac{\partial E v_a}{\partial D} - \sigma'\right)\frac{1}{\rho'}\frac{de}{d\alpha}\right]. \tag{10}$$

Prediction 2. *Highly risk-averse women who derive a particularly high benefit for camouflaging the abortion undertake more search effort than others, again resulting in more abortions and (to a lesser extent) camouflaged cases. These effects are more marked than those of Prediction 1 and depend on the cantons' stringency in enforcement of abortion regulation.*

The relationship with research question Q2 is evident while women especially interested in camouflaging an abortion are predicted to undertake more search effort than others, the effect of an increased stringency ($d\alpha > 0$) is ambiguous. According to Eq. (10), it importantly depends on $de/d\alpha$, which cannot be sighted from Eq. (4).

In addition, an answer to question Q3 (relating to exporting abortion to less stringent cantons) cannot be derived from Predictions 1 and 2 without additional assumptions. On the one hand, a

more stringent stance on abortion may discourage women who are strongly interested in obtaining an abortion [$de/d\alpha < 0$ in Eq. (8), implying $d/d\alpha(de/dA) < 0$]. However, there likely is a second type of women who in particular seek to avoid disclosure. For them, $d/d\alpha(de/dD) > 0$ is definitely a possibility if $\partial E_{v_a}/\partial D$ is very high while $de/d\alpha < 0$, according to Eq. (10) (at least in this very simple model that does not distinguish between search for a consenting and search for a camouflaging physician; see Prediction 1). However, camouflaging is part of an effort to keep the abortion secret; this endeavor is more likely to be successful when the abortion is performed away from home, typically in a less stringent canton. This leads to

Prediction 3. *Increased stringency of abortion regulation enforcement results in a higher propensity of abortion in less stringent cantons, e.g. a ballooning effect.*

4 Swiss Regulation and Official Abortion Statistics

The objective of this section is to provide an overview of the abortion law in Switzerland and of officially recorded abortion rates. Local preferences with regard to abortion are related to stringency of regulation (not directly observed) and official abortion rates. An important expression of local preferences is the popular referendum of 2002, according to which the federal abortion law was changed to become more liberal.[4] Due to the referendum an abortion is allowed on request during twelve weeks into pregnancy (Swiss Criminal Code Art. 118-120). From the 13th week on, an abortion is permitted only if it is, in the judgment of a physician, necessary to prevent the pregnant woman from sustaining serious physical injury or psychological distress. This risk must be more pronounced with more advanced pregnancy.

The new legislation was implemented by the twenty-six cantons in Switzerland with differing degrees of stringency, which however is not directly observable. Differences concern provider types that are permitted to perform a termination of pregnancy after the 12th week, and approved counseling services for young women.[5] In Fribourg (FR), for example, obtaining a second opinion is advised but not mandatory, and hospitals with a gynecological unit are permitted to perform an abortion. In Appenzell (AI and AR), a physician must confirm the health risk in writing, and only a cantonal hospital is permitted to perform an abortion. However, it is save to assume that differences in stringency reflect differences in local preferences, which are in turn expressed in the 2002 referendum.

[4] The referendum was possible due to several parties and interest groups' effort in collecting the 50,000 voter signatures required to force a popular referendum on the amendment. The vote was held on 2 June 2002, with 72.2% of Swiss voters supporting the change in law.

[5] All cantons introduced a standardized form for the termination of a pregnancy within the first 12 weeks and a form regarding the mandatory consultation for women under the age of 16. The cantons also developed an information sheet listing available counseling services (SVSS, 2011).

An overview of the geographic and religious characteristics of Switzerland is shown in Figure 3, while the cantonal percentages of no-votes (`nopc` in the referendum) are presented in Table 5 in Section 5. The three cantons with the lowest share of no-votes are Geneva (GE, 12.2%), Vaud (VD, 14.3 %), and Neuchâtel (NE, 14.6 %).

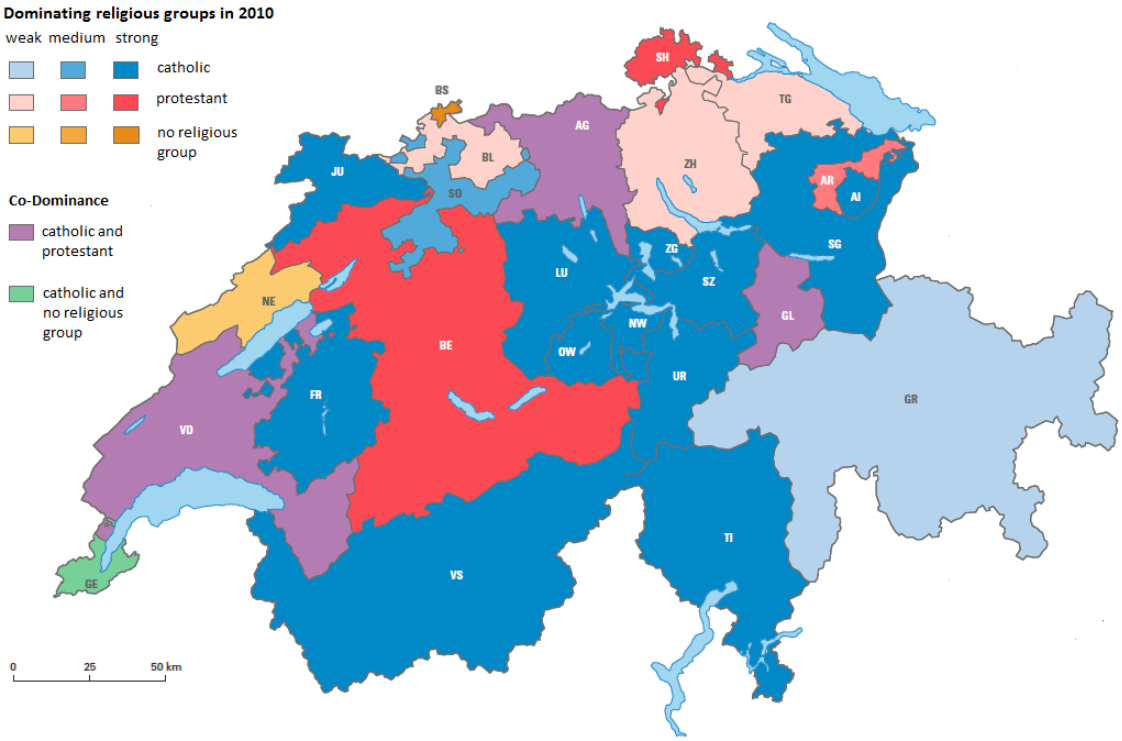

Figure 3 Religious groups in Swiss cantons in 2010. Source: FSO (2012).

According to Figure 3, GE and NE are strongly protestant. It would therefore be tempting to relate the no-shares to a canton's religious orientation. However, the canton Fribourg (FR), while strongly catholic, has a no-share of only 28.9%, close to the average of 27.8%. Evidently other influences such as urbanization have an impact too. Therefore, the share of no-votes has been retained as the indicator of preferences regarding abortion.

During the observation period 2004-2014, there has been little variation in official abortion rates. The average value over this period amounts to approximately 6.3 per 1,000 women with a slight decline since 2011 (see Figure 4).[6] It is among 5.0 among women in the 15-19 age group and strongly decreasing. However, developments over time again differ between cantons. In the canton of Jura (JU), the rate dropped by some 25% between 2007-2010 and 2011-2014, while it increased in the canton of Schaffhausen (SH, +21%), Vallais (VS, +18%), Nidwald (NW, +18%), and Neuchâtel

[6] In Switzerland, every abortion has to be reported to health authorities for statistical purposes, with guaranteed anonymity of the woman and medical confidentiality preserved (Swiss Criminal Code Art. 119 No. 5). The Swiss Federal Statistical Office publishes statistics regarding abortions using these data (FSO, 2015, p. 4).

(NE, +17%) (FSO, 2015, p. 2). The reasons for this divergence are not obvious. On the one hand, it may reflect a change in behavior in that women in the remote, strongly catholic canton of JU increasingly turned to contraception; on the other hand, religious reservations against abortion may have weakened in NE, NW, SH, and VS.

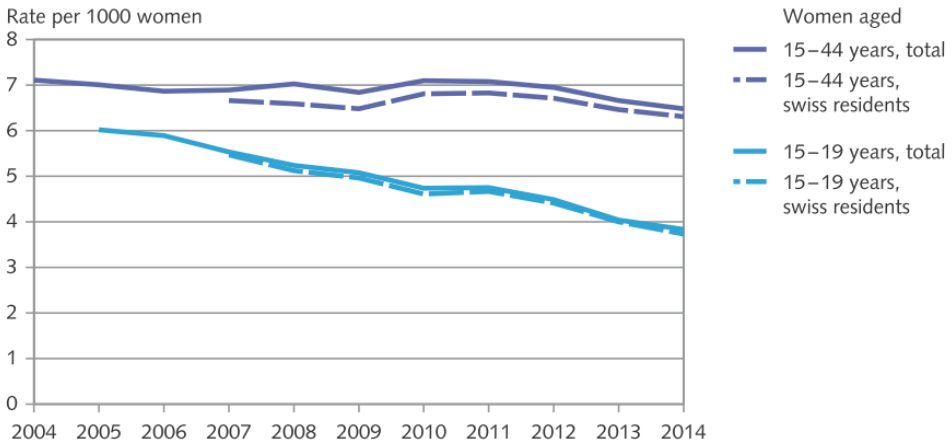

Figure 4 Abortion rates per 1,000 women. Source: FSO (2015, p. 1 (G1)).

For a first indication of ballooning, the differences in the "canton of abortion" and the "canton of residence" of the woman is instructive (see Figure 5). The more liberal cantons GE, VD, ZH, AR (neighbor to strongly catholic AI), and GR import abortion patients, their rates of abortion exceeding those attributable to their female resident population. The case of Ticino (TI) is exceptional because the canton is predominantly catholic. However, it has several private clinics that attract women from abroad (in particular neighboring Italy (FSO, 2015, p. 2)). Conversely, AI, OW, SZ, VS, and FR exhibit substantially lower rates of abortion than those reported according to women residing in these cantons; they export abortion patients. This constitutes evidence of ballooning at the aggregate regional level.

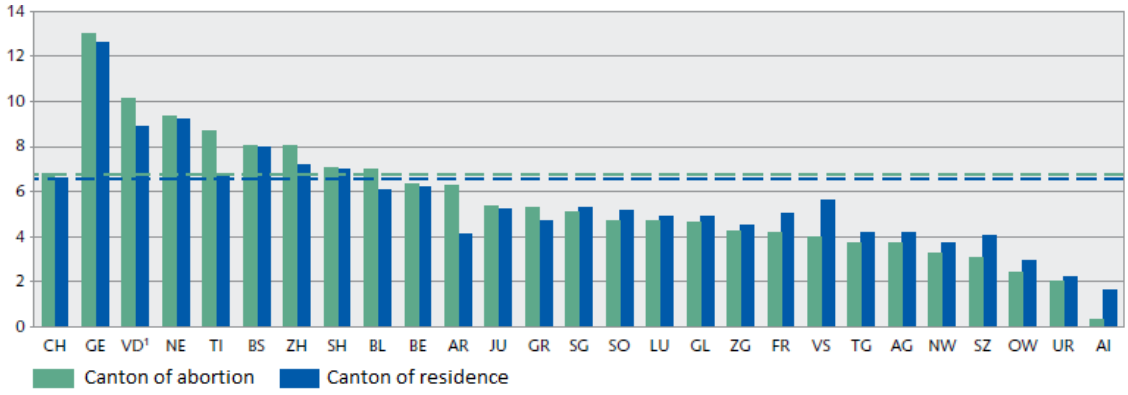

Figure 5 Mean abortion rate per 1,000 women between 15 and 44 from 2011 to 2014 (per canton of intervention and canton of residence). Source: FSO (2015, p. 2 (G4)).

5 Evidence from Swiss Health Insurance Data

5.1 Data

A unique data set provided by a large Swiss social health insurer with business in all cantons is used to test the theoretical predictions. The data set contains 80,354 observations on 31,776 women regarding events related to pregnancy between 2003 and 2013.[7] It includes socio-demographics (year of birth, marital status, nationality, and canton of residence, respectively), the number of persons in the family, the composition of the family, and further information if the event is an abortion (the canton where the abortion was performed, the provider type, and provider subtype).

Table A1 in the appendix presents summary statistics and a short description of selected variables. Descriptive statistics are presented for two samples: the full sample and a reduced sample including only observations between 2004 and 2010. Documented events are *consultation for pregnancy* (39,043 observations), *abortion* (3,928 observations), *birth* (37,119 observations), and *miscarriage* (264 observations). Table 1 reveals a telling fact about the frequency of these events according to age groups. Over the years 2003 to 2013, a mere 237 pregnancy-related consultations were recorded among the youngest (<19) age group, associated with 83 abortions and 175 births. In the next higher age group (19-25), the number of consultations increases 25-fold, that of births 30-fold, but that of abortions only 8.8-fold. This supports the notion that women in this age group had to exert much more search effort (resulting in "suspicious" consultations) to find a physician willing to issue a supporting report and/or to perform the abortion. This interpretation is confirmed by scaling factors of 107 (consultation), 139 (birth), and only 25 (abortions) in the 26-35 age group, while in the >36-group (where physicians are more likely to recognize a health risk) they are 31, 43, and 13, respectively. For reported events, the age of the woman ranges between 12 and 52; in 65% of them, the woman is between 26 and 35 year old. The highest number of abortions (2,067 between 2003 and 2013) is documented in this age category as well (see Table 1).

woman's age group	**consultation**	**abortion**	**child birth**	**miscarriage**	**total**
<19	237	83	175	2	**497**
19-25	5,973	730	5,188	32	**11,923**
26-35	25,393	2,067	24,291	165	**51,916**
>36	7,440	1,048	7,465	65	**16,018**
total	**39,043**	**3,928**	**37,119**	**264**	**80,354**

Table 1 Frequency table for woman's age group and documented events

[7] Observations with missing data in the relevant variables are excluded.

In Switzerland, there is mandatory health care insurance with a statutory minimum deductible (standard deductible).[8] Instead of the standard deductible a higher deductible can be chosen in return for a premium reduction. A woman who decides to take the minimum deductible (`minded`=1) is assumed to be particularly risk averse. This is the case for approximately one half of the observations (see Table A1).

5.2 Testing the Model's Predictions

The objective of this section is to juxtapose the predictions in Section 3 with the insurance records. Prediction 1 states that women who derive a particularly high benefit from an abortion undertake more search effort than others, resulting in a higher likelihood of abortion and (to a lesser extent) of camouflage. If the likelihood of a physician refusing to endorse the abortion is high initially, as in jurisdictions with strict enforcement, both effects should be particularly marked. This calls for interacting indicators of high benefit `unmarr`, `nkids`, `age1218`, and of risk aversion `minded` with `nopc` (percentage of no-votes), the indicator of stringency of abortion regulation (see Section 4). Finally, dummy variables for the year of the event are included, again in interaction with `nopc` because the aggregate data discussed in Section 4 suggests that attitudes may have changed over time in the stringent cantons.

Probit estimation results and marginal effects for Pr(`abortion`) are displayed in Table 2.[9] As predicted, all three indicators of benefit from abortion have positive signs when interacted with `nopc` (only `age1218_nopc` is not significant). This finding is in accordance with extra search effort being undertaken by women who live in cantons with high stringency. The coefficient for `minded_nopc` is negative, indicating that highly risk averse women in these cantons tend to refrain from abortion, as one would expect. More interestingly, Prediction 1 states that the effect of risk aversion (given the benefit of abortion) should depend on the canton's stringency, calling for a set of three-way interactions. This prediction is confirmed in two of three cases (`unmarr_minded_nopc`, `nkids_minded_nopc`); the effect is encouragement of abortion [recall the ambiguous sign of Eq. (8)].

With regard to development over time, `y2005_nopc` indicates a drop by 7.2 percentage points in abortions compared to the 2004 benchmark in more stringent cantons; since then, this drop has been tapering off, reaching some 3.0 percentage points. A possible interpretation is that women in cantons with more stringent implementation of the law migrated to more liberal ones in 2004

[8] This mandatory health care insurance is a basic insurance with a free choice of doctor and provides cover for the statutory basic benefits in the event of illness, accident and maternity. Premiums depend on the place of residence, age, and the deductible. See `okdeduc` in Table A1.

[9] Observations in 2003 and after 2010 are excluded to be used for a final test. Probit is used because only two of the possible four events (see Table 1) are analyzed; logistic regression would require the independence of irrelevant alternatives assumption.

and 2005, but began to realize that this was not necessary to the same extent as time went on. This interpretation is supported by the interaction terms of the type `y200x_minded_nopc`. Indeed, the term `y2005_minded_nopc` with its coefficient of +1.727 already neutralizes the coefficient of -1.808 pertaining to `minded_nopc`; that of `y2010_minded_nopc` (2.118) even exceeds it. This suggests that the stringency of abortion regulation has lost its influence over risk-averse women considering abortion. These statements are vindicated by specification No. 2, which excludes non-significant explanatory variables in that estimated coefficients are highly robust.

Prediction 1 also states that a given benefit of abortion induces search for camouflage, at least to some extent; this effect should be more marked when camouflage conveys a benefit of its own, according to Prediction 2. It should be noted that a direct test for camouflage is not possible given that the dataset does not contain any separate indicators of its benefit. Yet, an indirect test can be performed by comparing `birth` and `abortion`. Admittedly, some births may be camouflaged, as well; however, in most cases they constitute an event that is happily recorded. Women are predicted to undertake much less search effort because the likelihood (see ρ in Eq. (8)) of a physician refusing to help in delivery is very small. This implies that the difference between more stringent and liberal cantons has a smaller effect in Pr(`birth`) than Pr(`abortion`). Estimation results and marginal effects for Pr(`birth`) are displayed in Table 3. For the necessary comparison it is inappropriate to compare marginal effects of Tables 2 and 3, but elasticities need to be compared, since there are significantly more births in the data set than abortions. The probability for `abortion` – holding all predictors at their means – equals $Pr(\texttt{abortion} = 1|\bar{X}) = 0.0427$. For `birth`, one has $Pr(\texttt{birth} = 1|\bar{X}) = 0.447$. The elasticity of a binary variable is the marginal effect divided by the mean, resulting in ε_a for abortion and ε_b for birth, respectively. Using estimated marginal effects of `unmarr_nopc` shown in specification No. 2 of Tables 2 and 3 as an example, one obtains

$$\frac{\varepsilon_a}{\varepsilon_b} = \frac{0.049}{-0.148} \cdot \frac{0.4471}{0.0427} = |-3.47| > 1 \Rightarrow \varepsilon_a > \varepsilon_b, \tag{11}$$

and similarly, for `nkids_nopc` as well as `age1218_nopc`, it holds true that $\varepsilon_a > \varepsilon_b$. This confirms the prediction that the difference between more stringent and liberal cantons has a smaller effect on Pr(`birth`) than on Pr(`abortion`).

A comparison of estimated standard errors relating to the benefit indicators provides a final test for the importance of camouflage. To the extent that *camouflage* imparts a measurement error to the dependent variable in Pr(`abortion`) that is absent from Pr(`birth`), standard errors as shown in Table 2 are predicted to exceed those in Table 3. Indeed, this is the case for all three benefit indicators. For instance, the standard error pertaining to the coefficient of `unmarr_nopc` in Table 2 (abortion) is 0.0987, while that in Table 3 (birth) is 0.0402.

Pr(abortion)	(1)	(1)	(2)	(2)
VARIABLES	probit coeff	MEM	probit coeff	MEM
unmarr_nopc	0.532***	0.0484***	0.539***	0.0490***
	(0.0991)	(0.00898)	(0.0987)	(0.00895)
nkids_nopc	0.0998**	0.00907**	0.103**	0.00935**
	(0.0415)	(0.00377)	(0.0414)	(0.00376)
age1218_nopc	0.811	0.0737		
	(0.923)	(0.0839)		
minded_nopc	-1.808***	-0.164***	-1.815***	-0.165***
	(0.207)	(0.0186)	(0.207)	(0.0186)
unmarr_minded_nopc	0.414***	0.0376***	0.449***	0.0408***
	(0.130)	(0.0118)	(0.128)	(0.0116)
nkids_minded_nopc	0.263***	0.0239***	0.275***	0.0250***
	(0.0554)	(0.00503)	(0.0548)	(0.00499)
age1218_minded_nopc	-0.268	-0.0243		
	(0.954)	(0.0867)		
y2005_nopc	-0.797***	-0.0724***	-0.793***	-0.0721***
	(0.150)	(0.0136)	(0.150)	(0.0136)
y2006_nopc	-0.426***	-0.0387***	-0.428***	-0.0389***
	(0.132)	(0.0120)	(0.132)	(0.0120)
y2007_nopc	-0.485***	-0.0441***	-0.488***	-0.0443***
	(0.132)	(0.0119)	(0.131)	(0.0119)
y2008_nopc	-0.459***	-0.0417***	-0.462***	-0.0420***
	(0.132)	(0.0120)	(0.132)	(0.0120)
y2009_nopc	-0.338***	-0.0307***	-0.340***	-0.0309***
	(0.127)	(0.0116)	(0.127)	(0.0115)
y2010_nopc	-0.332***	-0.0302***	-0.335***	-0.0305***
	(0.128)	(0.0116)	(0.128)	(0.0116)
y2005_minded_nopc	1.727***	0.157***	1.721***	0.156***
	(0.263)	(0.0237)	(0.263)	(0.0237)
y2006_minded_nopc	1.802***	0.164***	1.796***	0.163***
	(0.246)	(0.0221)	(0.246)	(0.0221)
y2007_minded_nopc	1.880***	0.171***	1.871***	0.170***
	(0.245)	(0.0220)	(0.245)	(0.0220)
y2008_minded_nopc	1.898***	0.173***	1.886***	0.171***
	(0.245)	(0.0220)	(0.245)	(0.0220)
y2009_minded_nopc	2.079***	0.189***	2.066***	0.188***
	(0.240)	(0.0216)	(0.240)	(0.0216)
y2010_minded_nopc	2.118***	0.192***	2.106***	0.191***
	(0.240)	(0.0216)	(0.240)	(0.0215)
Constant	-1.709***		-1.710***	
	(0.0264)		(0.0264)	
Observations	56,946	56,946	56,946	56,946
LR χ^2(df)	522.46 (19)		516.84 (17)	
McFadden R^2	0.0246		0.0244	

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1
NOTE: All predictors at their mean value for MEM (marginal effect)

Table 2 Probit coefficients and marginal effects for `abortion`

Pr(birth)	(1)	(1)	(2)	(2)
VARIABLES	probit coeff	MEM	probit coeff	MEM
unmarr_nopc	-0.340***	-0.134***	-0.374***	-0.148***
	(0.0580)	(0.0229)	(0.0402)	(0.0159)
nkids_nopc	-0.0445*	-0.0176*	-0.0347**	-0.0137**
	(0.0231)	(0.00914)	(0.0166)	(0.00657)
age1218_nopc	-0.438	-0.173		
	(0.675)	(0.267)		
minded_nopc	0.258***	0.102***	0.278***	0.110***
	(0.0880)	(0.0348)	(0.0832)	(0.0329)
unmarr_minded_nopc	-0.0337	-0.0133		
	(0.0814)	(0.0322)		
nkids_minded_nopc	0.0327	0.0129		
	(0.0336)	(0.0133)		
age1218_minded_nopc	-0.0622	-0.0246		
	(0.703)	(0.278)		
y2005_nopc	0.256***	0.101***	0.248***	0.0979***
	(0.0758)	(0.0300)	(0.0741)	(0.0293)
y2006_nopc	0.239***	0.0946***	0.232***	0.0919***
	(0.0720)	(0.0285)	(0.0702)	(0.0278)
y2007_nopc	0.398***	0.158***	0.392***	0.155***
	(0.0707)	(0.0279)	(0.0686)	(0.0271)
y2008_nopc	0.362***	0.143***	0.356***	0.141***
	(0.0715)	(0.0283)	(0.0694)	(0.0274)
y2009_nopc	0.414***	0.164***	0.410***	0.162***
	(0.0702)	(0.0277)	(0.0682)	(0.0270)
y2010_nopc	0.382***	0.151***	0.381***	0.151***
	(0.0710)	(0.0281)	(0.0689)	(0.0272)
y2005_minded_nopc	-0.299**	-0.118**	-0.289**	-0.114**
	(0.120)	(0.0473)	(0.118)	(0.0469)
y2006_minded_nopc	-0.217*	-0.0859*	-0.208*	-0.0824*
	(0.116)	(0.0458)	(0.114)	(0.0453)
y2007_minded_nopc	-0.443***	-0.175***	-0.432***	-0.171***
	(0.115)	(0.0454)	(0.113)	(0.0448)
y2008_minded_nopc	-0.259**	-0.102**	-0.250**	-0.0987**
	(0.115)	(0.0457)	(0.114)	(0.0450)
y2009_minded_nopc	-0.463***	-0.183***	-0.455***	-0.180***
	(0.115)	(0.0453)	(0.113)	(0.0447)
y2010_minded_nopc	-0.328***	-0.130***	-0.325***	-0.128***
	(0.115)	(0.0455)	(0.113)	(0.0447)
Constant	-0.196***		-0.197***	
	(0.0151)		(0.0150)	
Observations	56,946	56,946	56,946	56,946
LR χ^2(df)	139.52 (19)		131.34 (15)	
McFadden R^2	0.0018		0.0017	

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1
NOTE: All predictors at their mean value for MEM

Table 3 Probit coefficients and marginal effects for `birth`

It is important to note that in the regression for Pr(`birth`), all estimated coefficients have the opposite sign of those for Pr(`abortion`). This suggests that local preferences against abortion (reflected by `nopc`, the share of no-votes in the 2002 referendum) encourage births. More generally, neglected determinants of Pr(`abortion`) and Pr(`birth`) (among them religious orientation in particular) appear to be negatively correlated, as indicated by the coefficient $\hat{\varrho} = -0.924$ between residuals in a bivariate probit estimate. While parameter estimates differ only slightly from those reported in Tables 2 and 3, the gain in efficiency is small.[10]

With thousands of observations, there is a considerable risk of over-fitting. In the guise of a (partial) out-of-sample test, specifications No. 1 of Pr(`abortion`) and Pr(`birth`) are shown in Table A2 of the appendix, based on the full 2003-2013 observation period. With very few exceptions, the parameter estimates are of he same sign and close in value to those reported in Tables 2 and 3, respectively, suggesting a stable relationship.

Finally, Prediction 3 states that increased stringency of regulatory enforcement results in a higher propensity of abortion in less stringent cantons, i.e., a ballooning effect. In Table 4 (reduced sample) the variable `migration` indicates whether the canton where the abortion is performed differs from the woman's canton of residence. Stringency of regulation in the canton of residence is again measured by `nopc`, whereas the (typically more liberal) attitude of the "importing" canton where the abortion is performed is mirrored by `yespcabo`, the share of yes-votes in the 2002 referendum.

variable	mean	stdev	min	max	description
`migration`	0.1515	0.3586	0	1	migration to another canton for abortion
`nopc`	0.3240	0.1077	0.122	0.601	% no-vote in canton of residence
`yespcabo`	0.6885	0.1076	0.459	0.878	% yes-vote in canton of abortion

Table 4 Descriptive statistics for abortions, subsample, N=2,614 (2004-2010)

In Table 5, cantons are ordered according to their share of no-votes (`nopc`). The canton of Geneva (GE) exhibits the minimum value of 12.2%, and 75 women with GE residence underwent an abortion from 2004-2010. Only two of them migrated to another canton, while eight came to the canton, bringing the total of abortions performed to 81 (=75-2+8), resulting in an "import" of six cases. The case of the nore populous canton of Vaud (VD) is even more telling. Its no-share is 14.3%, and 191 out of 199 resident women chose to have their abortion there, amounting to an "export" of eight cases. At the same time, 58 women migrated to this rather liberal canton, bringing the

[10] Details are available from authors upon request.

total up to 249 abortions and resulting in a net "import" of 50 cases. Conversely, the majority of the cantons with `nopc`<27.8% (the national average) are net exporters. Overall, in 396 cases (15 percent of 2,614) the pregnancy was not terminated in the canton of residence of the woman, pointing to substantial *abortion tourism* (see Table 5).

		`migration` from canton				`migration` to canton		total	"Export" (−)
Canton	`nopc`	0	1	residents	`yespcabo`	0	1	abortion	"Import" (+)
GE	.122	73	2	75	.878	73	8	81	6
VD	.143	191	8	199	.857	191	58	249	50
NE	.146	44	4	48	.854	44	3	47	-1
BS	.182	10	5	15	.818	10	30	40	25
BL	.202	56	29	85	.798	56	17	73	-12
ZH	.225	266	18	284	.775	266	81	347	63
BE	.266	45	11	56	.734	45	12	57	1
FR	.289	102	27	129	.711	102	4	106	-23
GL	.292	9	3	12	.708	9	1	10	-2
ZG	.292	68	11	91	.708	68	24	92	13
SO	.300	43	23	66	.700	43	8	51	-15
AG	.311	269	36	305	.689	269	30	299	-6
JU	.317	35	3	38	.683	35	1	36	-2
SH	.326	7	1	8	.674	7	2	9	1
AR	.349	7	7	14	.651	7	24	31	17
GR	.362	21	3	24	.638	21	8	29	5
TI	.368	82	0	82	.632	82	0	82	0
NW	.369	14	12	26	.631	14	11	25	-1
LU	.399	431	35	466	.601	431	43	474	8
TG	.402	40	15	55	.598	40	4	44	-11
SG	.412	194	57	251	.588	194	21	215	-36
SZ	.426	61	43	104	.574	61	2	63	-41
OW	.437	18	7	25	.563	18	1	19	-6
UR	.493	13	0	13	.507	13	0	13	0
VS	.541	119	33	152	.459	119	3	122	-30
AI	.601	0	3	3	.399	0	0	0	-3
Average	.278				0.722				
Total		2,218	396	2,614		2,218	396	2,614	

Table 5 No-votes, yes-votes, and `migration` from and to canton for abortion, 2004-2010

Table 6 exhibits probit estimates for Pr(`migration`). The specification is the same as in Table 2, with two exceptions: first, the interaction terms invoting `nopc` are dropped because the subsample analyzed here only contains women who opted for an abortion; second, the product `nopc_yespcabo` is

added to reflect the joint effect of the "push" factor `nopc` in the exporting canton and the "pull" factor `yespcabo`, meaning the (generally more liberal) attitude of the importing canton. The multiplicative form is in accordance with the hypothesis that "push" and "pull" factors reinforce each other. Denoting by β the coefficient pertaining to `nopc_yespcabo`, one obtains $\partial Pr(\texttt{migration})/\partial \texttt{yespcabo} = \beta \cdot \texttt{nopc}$, which is positive if $\beta > 0$; conversely, $\partial Pr(\texttt{migration})/\partial \texttt{nopc} = \beta \cdot \texttt{yespcabo} > 0$, too. Indeed, β is positive and highly significant, suggesting that the posited reinforcement effect exists. The estimate also points to ballooning. To gauge its magnitude, assume that the exporting canton has a `nopc` value that is 10% above the the national average of 0.278, while the importing canton has a `yespcabo` value of 10% above the average. Therefore, between them `nopc_yespcabo`$= (0.278 \cdot 0.722) \cdot 1.1^2 = 0.2429$, which is 21 percent higher than the average value of $0.278 \cdot 0.722 = 0.2008$. According to specification No. 2 of Table 6, the increase in `nopc_yespcabo` translates into an increase of Pr(`migration`) of 1.939 (0.2429 - 0.2008) = 0.0816. Compared to the the nationwide value of 0.1515 (see Table 4), this is an increase of 53.9%. The elasticity of Pr(`migration`) with respect to the 10% change in both `nopc` and `yespcabo` therefore amounts to 2.56 (= 53.9% / 21%). Evidently, Prediction 3 is vindicated: When it comes to abortion in Switzerland, there is a clear and sizeable ballooning effect between stringent and less stringent cantons. This finding is again confirmed when the observation period is extended to 2003-2013.[11]

[11] Details available on request.

Pr(migration)	(1)	(1)	(2)	(2)
VARIABLES	probit coeff	MEM	probit coeff	MEM
unmarr	0.0323	0.00684		
	(0.0735)	(0.0157)		
nkids	-0.0214	-0.00449		
	(0.0344)	(0.00724)		
age1218	0.382*	0.0972		
	(0.203)	(0.0605)		
minded	-0.0633	-0.0133		
	(0.0652)	(0.0137)		
nopc_yespcabo	9.278***	1.952***	9.196***	1.939***
	(0.649)	(0.138)	(0.643)	(0.137)
y2005	-0.646***	-0.0985***	-0.633***	-0.0974***
	(0.192)	(0.0199)	(0.192)	(0.0202)
y2006	-0.580***	-0.0959***	-0.584***	-0.0966***
	(0.180)	(0.0226)	(0.180)	(0.0226)
y2007	-0.706***	-0.112***	-0.706***	-0.112***
	(0.181)	(0.0206)	(0.181)	(0.0207)
y2008	-0.556***	-0.0941***	-0.556***	-0.0943***
	(0.178)	(0.0236)	(0.178)	(0.0236)
y2009	-0.592***	-0.102***	-0.592***	-0.102***
	(0.175)	(0.0240)	(0.175)	(0.0241)
y2010	-0.505***	-0.0898***	-0.501***	-0.0893***
	(0.174)	(0.0257)	(0.174)	(0.0258)
Constant	-2.490***		-2.521***	
	(0.222)		(0.213)	
Observations	2,614	2,614	2,614	2,614
LR χ^2(df)	281.29 (11)		276.30 (7)	
McFadden R^2	0.1265		0.1243	

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1
NOTE: All predictors at their mean value for MEM

Table 6 Probit coefficients and marginal effects for `migration` (2004-2010)

6 Policy Implications and Conclusions

Using a large data set from a Swiss social health insurer, this paper studies two phenomena related to health insurance: camouflage and ballooning. The present analysis differs from the existing literature in that search effort of a woman seeking an abortion, possibly combined with camouflage, is explicitly modeled and analyzed. Stringent local enforcement in some Swiss cantons (but not in others) of the outcome of a popular referendum on abortion held in 2002 permits to derive three testable predictions, which receive a considerable measure of empirical support. In particular, there

is evidence of ballooning in that women residing in cantons with stricter enforcement undertake extra costly search effort, often resulting in migration to another, more liberal canton. Moreover, a comparison with births suggests that a significant share of abortions is camouflaged by contrived medical coding when the woman has residency in a "strict" canton.

The analysis of Sections 4 and 5 sheds light on a trade-off between respecting local preferences and search cost: on the one hand, some of the Swiss cantons implement federal regulation concerning abortion in a stringent way because of a high share of no-votes in the referendum of 2002; on the other hand, stringent implementation causes women to undertake costly effort in search of a physician who is willing to issue the necessary supporting report and/or perform the intervention. Section 5 contains clear indications suggesting that this search also induces "abortion tourism" within Switzerland. This phenomenon can be mitigated by mandating cantons to implement the federal law in a uniform way, thereby preserving equality in the face of the law. Yet, this means that marked differences in regional preferences tend to be disregarded, which causes a significant loss in economic welfare.

The current study has several limitations resulting from the availability and content of the given data. Swiss health insurers do not collect information regarding a woman's working status, her level of education, overall household income, as well as religious orientation. In particular, the amount of search and camouflage cannot be estimated directly but needs to be inferred using a comparison between abortion and (more openly disclosed) births. Finally, the variable used to measure regulation stringency in a canton is somewhat deficient. Popular sentiment regarding abortion, as expressed in the 2002 referendum, may well diverge from actual implementation, which also has several dimensions (e.g., mandate to have the intervention performed in the cantonal hospital). However, the finding that these cantonal differences induce costly search, camouflage, and abortion tourism is likely to be robust.

Appendix

	full sample, N=80,354				reduced sample, N= 56,946[a]				
variable	**mean**	**stdev**	**min**	**max**	**mean**	**stdev**	**min**	**max**	**description**
event	1.497	1.4715	0	4	1.445	1.4721	0	4	documented event (=consultation/abortion/birth/miscarriage)
abortion	0.0489	0.2156	0	1	0.0459	0.2093	0	1	abortion (yes=1 other=0)
birth	0.4619	0.4986	0	1	0.4472	0.4972	0	1	birth (yes=1 other=0)
yearevt	2008.5	2.653	2003	2013	2007.4	1.8860	2004	2010	year of documented event
ybirth	1977.6	5.6453	1956	1998	1976.5	5.4623	1956	1996	year of birth
age	30.97	5.1934	12	52	30.85	5.2208	12	50	age of woman (in years)
age1218	0.0062	0.0784	0	1	0.00687	0.0826	0	1	woman's age <19 (yes=1 no=0)
cantres	.	.	.	.	.	.	.	.	canton of residence
cantabo	.	.	.	.	.	.	.	.	canton of abortion
unmarr	0.2257	0.4180	0	1	0.1899	0.3922	0	1	unmarried (yes=1 no=0)
npersfam	3.207	1.1444	1	13	3.230	1.1472	1	13	number of persons in family
nkids	1.205	0.8641	0	11	1.237	0.8688	0	11	number of children in family
deduc	862.74	715.1809	0	2500	825.54	685.3213	0	2500	selected deductible for mandatory health insurance[b]
minded	0.4562	0.4981	0	1	0.4608	0.4985	0	1	woman chose minimum deductible (yes=1 no=0)

[a] In the reduced sample the year 2003 is excluded since there were only few births and no other events reported pointing to inaccurate documentation. Observations after 2010 are excluded to be used for a final test.

[b] The statutory minimum deductible (okdeduc) was CHF 230 for adults in 2003. Since 2004 it is CHF 300 per year. It does not apply to children (up to the age of 18). Instead of the minimum deductible a higher deductible can be chosen. Children may also choose a deductible in return for a premium reduction.

Table A1 Summary statistics for full and reduced sample

VARIABLES[a]	(1) Pr(abortion)	(2) Pr(birth)
unmarr_nopc	0.253***	-0.172***
	(0.0747)	(0.0435)
nkids_nopc	0.141***	-0.0136
	(0.0319)	(0.0188)
age1218_nopc	1.873***	-0.876
	(0.685)	(0.608)
minded_nopc	-0.478***	0.327***
	(0.0883)	(0.0518)
unmarr_minded_nopc	0.733***	-0.227***
	(0.101)	(0.0634)
nkids_minded_nopc	0.285***	-0.0696**
	(0.0443)	(0.0282)
age1218_minded_nopc	-1.370*	0.498
	(0.715)	(0.631)
y2005_nopc	-0.790***	-0.166**
	(0.132)	(0.0652)
y2006_nopc	-0.409***	-0.189***
	(0.111)	(0.0605)
y2007_nopc	-0.460***	-0.0361
	(0.109)	(0.0585)
y2008_nopc	-0.428***	-0.0829
	(0.109)	(0.0589)
y2009_nopc	-0.296***	-0.0327
	(0.103)	(0.0575)
y2010_nopc	-0.268***	-0.0735
	(0.103)	(0.0581)
y2005_minded_nopc	0.318*	-0.205**
	(0.181)	(0.0937)
y2006_minded_nopc	0.384**	-0.121
	(0.154)	(0.0886)
y2007_minded_nopc	0.456***	-0.343***
	(0.152)	(0.0871)
y2008_minded_nopc	0.468***	-0.151*
	(0.151)	(0.0874)
y2009_minded_nopc	0.642***	-0.360***
	(0.143)	(0.0863)
y2010_minded_nopc	0.659***	-0.221**
	(0.142)	(0.0865)
Constant	-1.720***	-0.0624***
	(0.0181)	(0.0104)
Observations	80,354	80,354
LR χ^2(df)	655.00 (19)	201.85 (19)
McFadden R^2	0.0209	0.0018

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

[a] Specifications in analogy to Tables 2 and 3 result in very similar estimates. In particular, adding interaction terms involving years beyond 2010 does not change results. Information criteria like AIC support these insights. Additional specifications can be obtained from the authors upon request.

Table A2 Probit estimates of Pr(`abortion`) and Pr(`birth`) using full sample (2003-2013)

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