

# ONLINE APPENDIX:

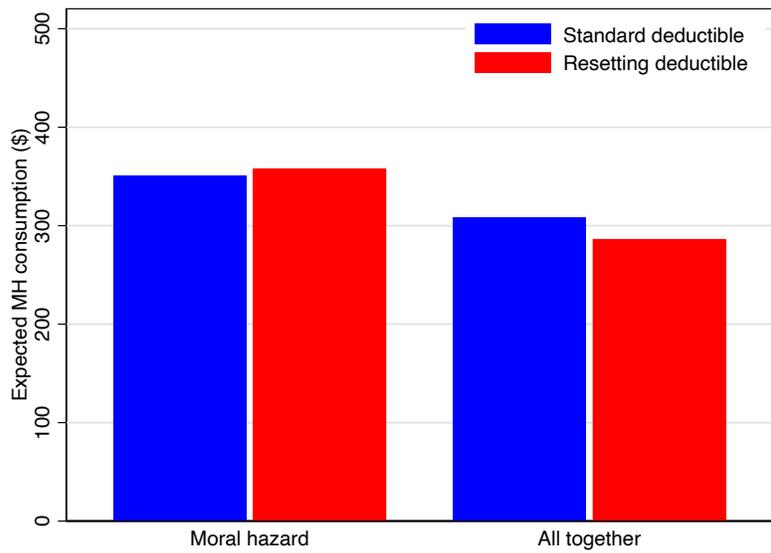
## Time aggregation in health insurance deductibles

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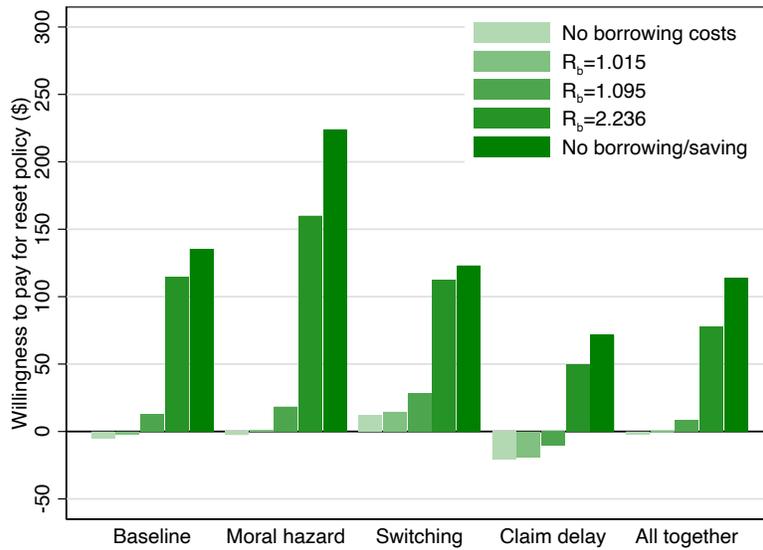
March 23, 2023

Appendix Figure 1: Overconsumption due to moral hazard, by environment



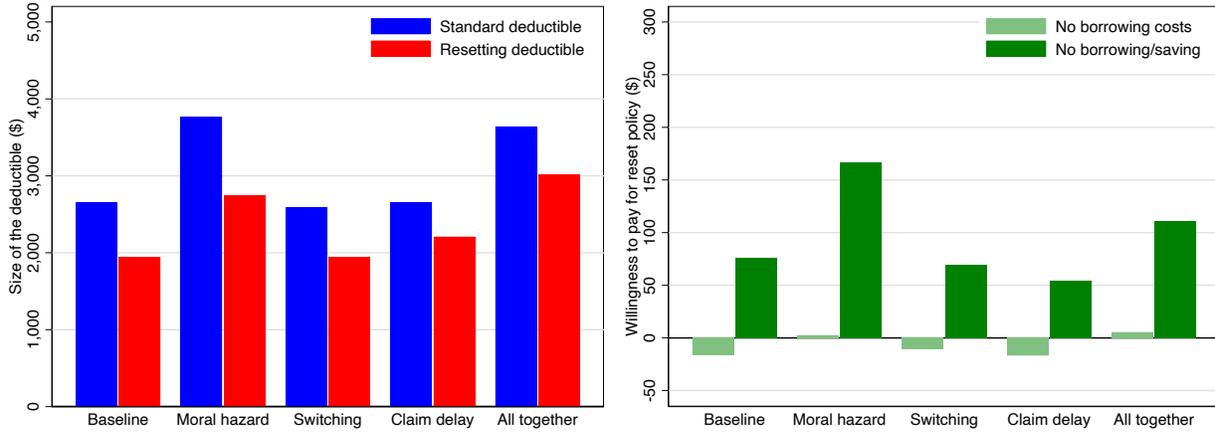
*Notes:* Figure presents the total extra medical consumption over the two periods due to moral hazard. The blue bars denote extra consumption under the standard deductible policy and red bars denote extra consumption under the resetting deductible policy. The bars on the left correspond to the environment with moral hazard only and the bars on the right correspond to the environment with moral hazard, contract switching, and claim delay.

Appendix Figure 2: Welfare gain of a resetting deductible policy, by environment and extra interest rates



Notes: Figure presents  $Z$ , the per-period willingness to pay for the resetting deductible policy, under five environments and within each environment, costless borrowing (lightest green), no borrowing or saving (darkest green), and a range of  $R_b$  values in between. From left to right, the sets of bars are (1) baseline (i.e., no moral hazard, contract switching, or claim delay), (2) moral hazard only, (3) contract switching only, (4) claim delay only, and (5) all mechanisms in (2)-(4). Other calibrated parameters are in Table 2.

Appendix Figure 3: Deductibles and willingness to pay under independent shock distribution

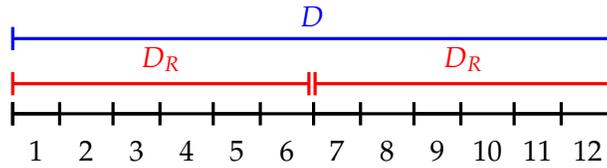


(a) Deductible sizes

(b) Willingness to pay for resetting ded. policy

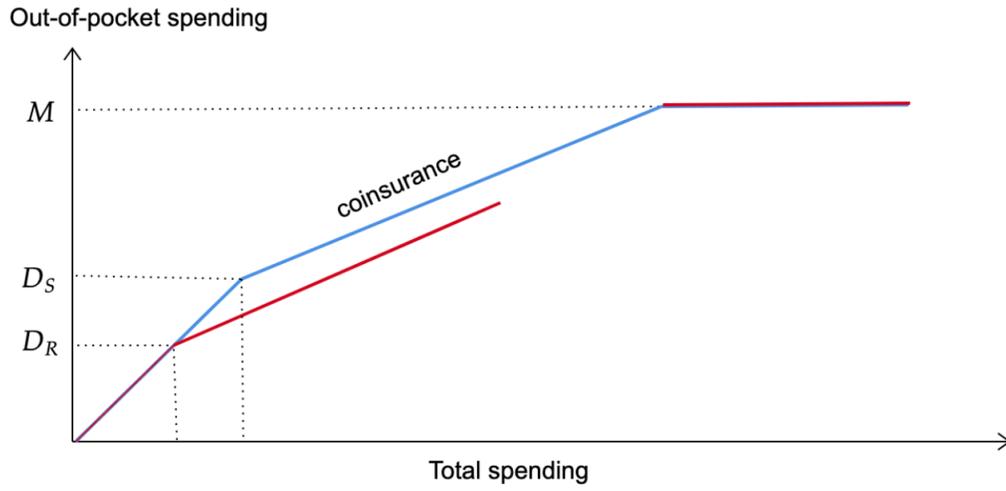
Notes: Left figure presents the size of the standard (annual) deductible  $D_S$  in blue and the size of the resetting (biannual) deductible  $D_R$  in red, under four scenarios: from left to right, (1) the baseline scenario with no moral hazard ( $w = 0$ ), no contract switching ( $q_m = 0$ ), and no claim delay ( $q_b$ ), (2) the scenario with only moral hazard, (3) the scenario with only contract switching, (3) the scenario with only claim delay, and (4) the scenario with all three of moral hazard, switching, and delay. Right figure presents the per-period willingness to pay for the resetting deductible policy for individuals who can costlessly borrow in light green and who cannot borrow in dark green for the same scenarios as in Panel (a).

Appendix Figure 4: Deductible timespan schematic, monthly periods



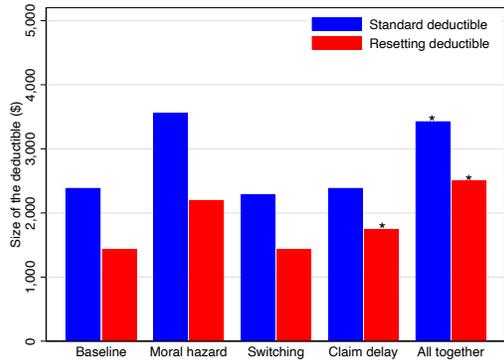
*Notes:* Figure depicts the length of time over which a deductible applies and resets. The black lines and numbers denote periods.  $D_R$  in red is the reset policy in which the deductible resets after six periods, while  $D_S$  in blue is the standard policy in which the deductible resets after twelve periods.

Appendix Figure 5: Three-armed policy schematic

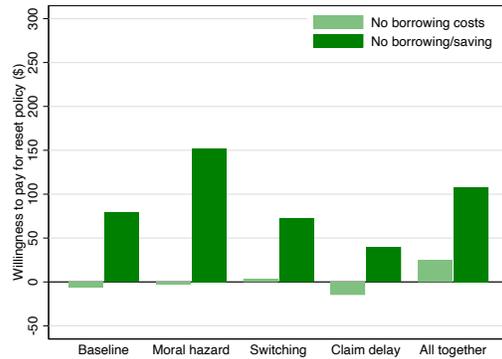


Notes: Figure depicts the three-armed policy as described in Section 5.

Appendix Figure 6: Deductibles and willingness to pay when the health shock is net of moral hazard and claim delay



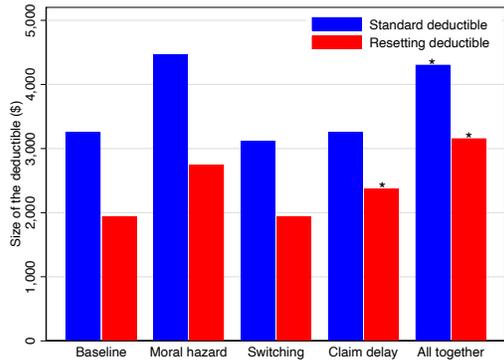
(a) Deductible sizes



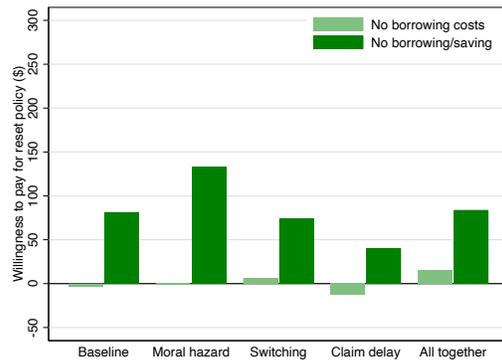
(b) Willingness to pay for resetting ded. policy

Notes: Left figure presents deductible sizes and right figure presents the per-period willingness to pay for the resetting deductible policy when the underlying health shock distribution is roughly purged of moral hazard and claim delay. We subtract moral hazard using the following (rough) rules: denoting  $L_{1e}$  and  $L_{2e}$  as the health expenditures observed in the data and  $L_1$  and  $L_2$  as the recovered health shocks, if  $L_{1e} \geq D_S + w$  then  $L_1 = L_{1e} - w$  and  $L_2 = \max\{L_{2e} - w, 0\}$ ; if  $L_{1e} < D_S + w$  and  $L_{1e} + L_{2e} \geq D_S + w$  then  $L_2 = \max\{L_{2e} - w, 0\}$ . We then adjust for claim delay by drawing a 40% random sample of the subset of claims for which  $L_{1e} = 0$  and  $L_{2e} > 0$ , and shifting  $0.5L_{2e}$  to  $L_{1e}$ .

Appendix Figure 7: Deductibles and willingness to pay when health costs are tax-free



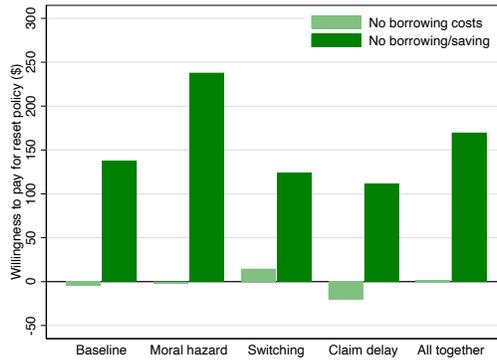
(a) Deductible sizes



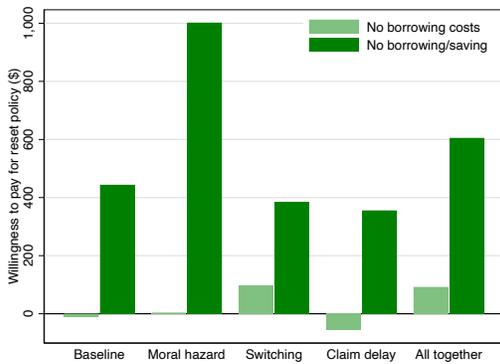
(b) Willingness to pay for resetting ded. policy

Notes: Left figure presents deductible sizes and right figure presents the per-period willingness to pay for the resetting deductible policy when out-of-pocket health expenditures are tax-free, as proxied by a 20% reduction in out-of-pocket costs.

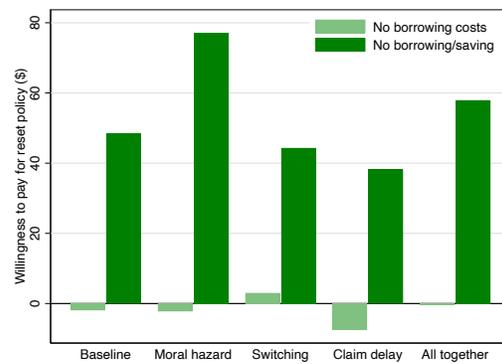
Appendix Figure 8: Welfare gain of a resetting deductible policy, CRRA, by income



(a) Income  $Y = 250\%$  FPL (baseline)



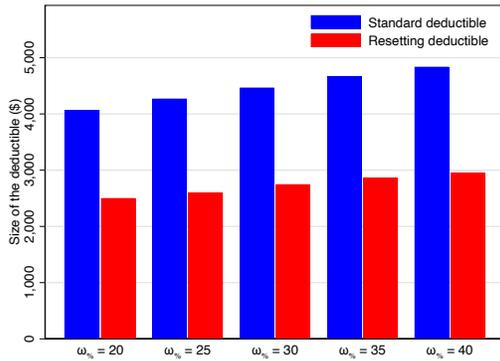
(b) Income  $Y = 150\%$  FPL



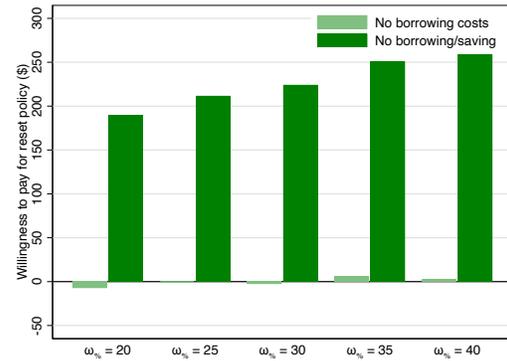
(c) Income  $Y = 500\%$  FPL

Notes: Each figure presents  $Z$ , the per-period willingness to pay for the resetting deductible policy for CRRA utility with risk aversion parameter of 4.5, under five environments and within each environment, costless borrowing (light green) and no borrowing or saving (dark green). From left to right, the sets of bars are (1) baseline (i.e., no moral hazard, contract switching, or claim delay), (2) moral hazard only, (3) contract switching only, (4) claim delay only, and (5) all mechanisms in (2)-(4). Other calibrated parameters are in Table 2 except the utility function, which is now CRRA with parameter  $\gamma = 4.5$  ( $U(x) = \frac{x^{1-\gamma}}{1-\gamma}$ ) and income  $Y$ , which is denoted in the subtitles.

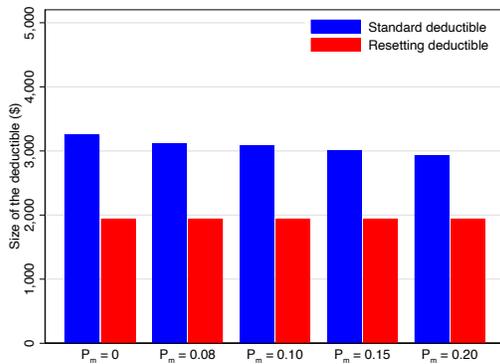
Appendix Figure 9: WTP and deductibles by varying parameter values



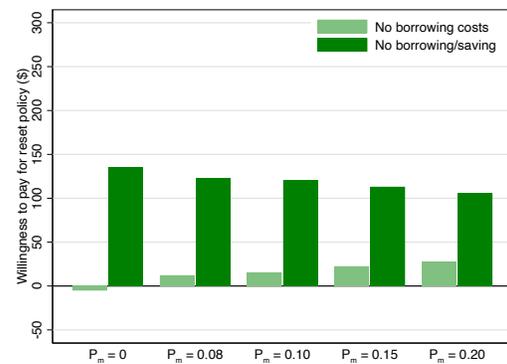
(a) Ded., varying moral hazard



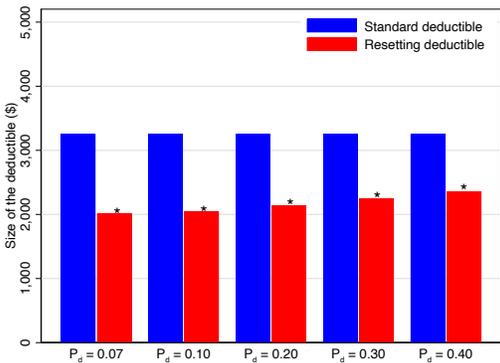
(b) WTP, varying moral hazard



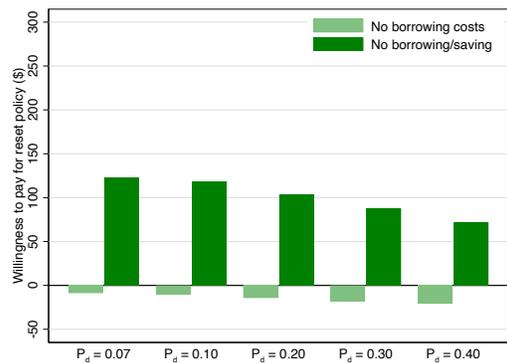
(c) Ded., varying prob. of switching



(d) WTP, varying prob. of switching



(e) Ded., varying prob. of delayability



(f) WTP, varying prob. of delayability

Notes: Left figures present deductible sizes and right figures present the per-period willingness to pay for the resetting deductible policy under the moral hazard environment with varying moral hazard parameters  $w$  (subfigures (a) and (b)), under the mid-year job switching environment with varying probability of mid-year job switching  $q_m$  (subfigures (c) and (d)), and under the endogenous claim delay environment with varying probability of delayability  $q_d$  (subfigures (e) and (f)).

Appendix Table 1: Willingness to pay for resetting deductible, claim delay case with various costs of delay

Liquidity environment: Deductible policy:	No borrowing costs		No borrowing/saving	
	Standard	Resetting	Standard	Resetting
<b>Panel A: Zero cost of delay</b>				
Percent that delay (%)	0	80.0	0	40.0
Deductible size (\$)	3,252	2,379	3,252	2,359
Willingness to pay (\$)	—	-20.8	—	71.6
<b>Panel B: 5% health cost in 1st period</b>				
Percent that delay (%)	0	76.7	0	33.3
Deductible size (\$)	3,252	2,319	3,252	2,292
Willingness to pay (\$)	—	-35.2	—	72.9
<b>Panel C: 5% health care cost in 2nd period</b>				
Percent that delay (%)	0	80.0	0	33.3
Deductible size (\$)	3,252	2,506	3,252	2,466
Willingness to pay (\$)	—	-62.4	—	32.3

*Notes:* Table reports the percent of individuals who delay (where we assume they do not delay if they are indifferent), the deductible sizes, and willingness to pay for the resetting deductible policy, in an environment with endogenous claim delay but not moral hazard or exogenous mid-year contract switching. The 5% cost corresponds to 5% of the first period health shock, and is applied as a non-health care cost to the first period in Panel B and as a health care cost to the second period in Panel C.