How Do Gamblers React to Wins?

Evidence from Bank Transaction Data in Japan

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Disclaimer

- The data were made available through a strict contract between Mizuho Bank and Waseda University, and were analyzed in a setting where measures were taken to prevent the identification of individuals, such as masking and other anonymous processing.
- The views and opinions expressed in this paper are solely those of the author and do not reflect those of Mizuho Bank.

Motivation & Research Questions

Research Questions

Q1: How do gamblers respond to wins?

- Betting **frequency** (how often they bet again)
- **Size** of bets (how much they stake)
- **Other consumption** (everyday spending from the same account)

Q2: What mechanisms drive transitions to heavy betting?

- Same three margins: frequency, bet size, and non-gambling spending

Preview of Results

1. **MPG** $= 0.075$: Gamblers re-bet 7.5% of unexpected wins within one week; persists $\sim$12 weeks
2. **MPC** $= 0.35$: 35% spent on consumption, but fades within 2 weeks
3. **Source dependence**: Same gamblers barely bet the government transfer (MPG ≈ 0) but spend both windfalls at similar rates
4. **Past outcomes matter**: Break-even effect, loss-coping effect, no loss-chasing
5. **Big wins and escalation**: big-win effect is lagged in weekly MPG; drives L$\rightarrow$H transition; raises future gambling proportion for light gamblers

$\Rightarrow$ **House money drives re-betting. The danger is winning.**

Big wins with past gambling escalate light gamblers and trap heavy ones.

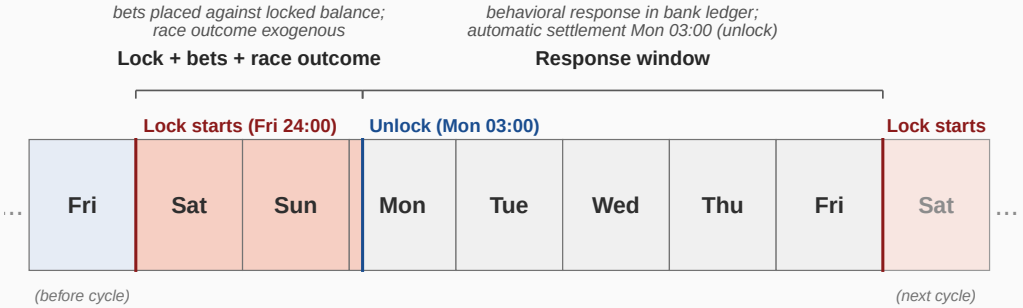
Roadmap

1. **Identification & data**
   A-PAT system · balanced weekly panel · gambling activity measures
2. **MPG & MPC**
   Baseline specification · main estimates · persistence and dynamics
3. **Source dependence** (if time)
   Gambling wins vs. government transfer (SCP) · gamblers vs. non-gamblers

Appendix (full paper; previewed above):
Past outcomes and loss responses · Big wins & escalation · Heterogeneity (intensity robustness, gambling preference, liquidity constraint)

Institutional Setting & Data

The A-PAT Natural Experiment



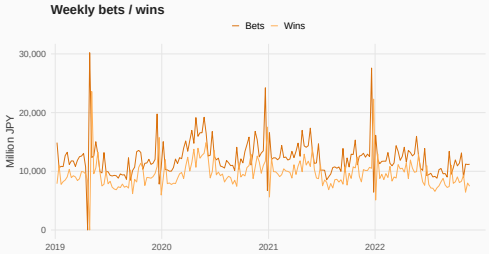
- Bets placed against locked balance during racing weekend
- Wins credited automatically when lock releases Monday
- **No activity possible between bet placement and settlement**

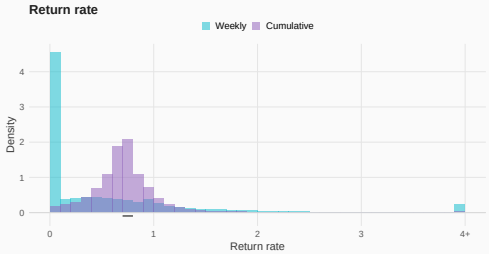
Data

- Japan has a thriving gambling industry. Online is the most popular.
- **Mizuho Bank** weekly transaction records
  - One of Japan's three megabanks ($\sim$22.5M retail customers)
  - Gambling bets, wins, and consumption in the *same* account ledger ($\sim$0.25M JRA)
  - Consumption: total outflow $-$ bets (robust with other measures)
- **Balanced weekly panel (2019-2022 Nov)**: 17,411 individuals of 204 weeks
  - having at least (1) 1 win; (2) 25 weeks of having non-gambling consumption
  - 17,411 are light. 36,350 heavy gamblers $\Rightarrow$ 53,761 total
  - Light (L): gambling proportion < 0.5; Heavy (H): ≥ 0.5
- **Sample demographics**: 94% male; most are the elderly; Kanto region.

▸ Gambling Market ▸ Sample Selection ▸ Demographics ▸ Transaction ID ▸ L/H Transitions

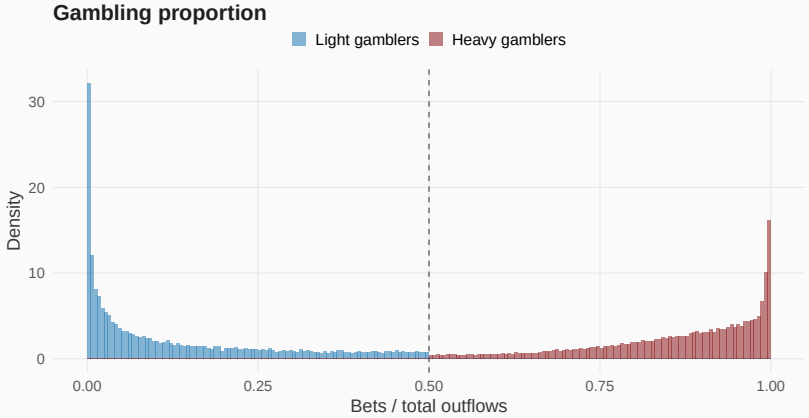
Gambling in Japan: Activity and Returns





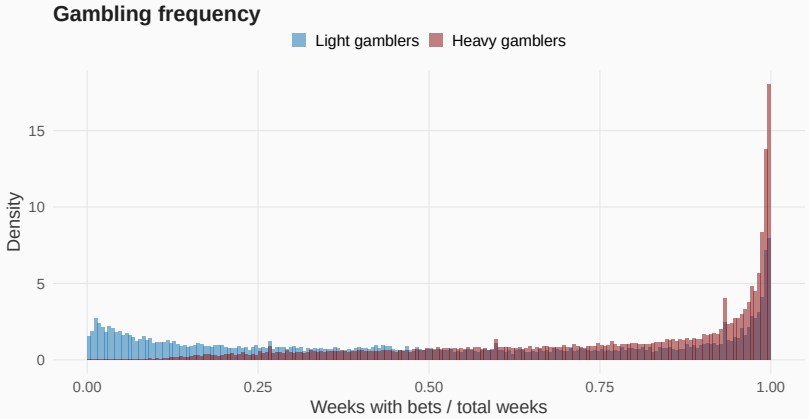
- Seasonal peaks: G1 races (the most prestigious race in Japan).
- Return rate $\approx$ 75%; $\sim$40% of weekly bets are a complete loss
- Weekly return rate concentrates at zero; cumulative returns converge toward 75%
- **Large win**: return ratio > 1.6 (90th percentile of the weekly distribution)

Gambling Proportion



- **Gambling proportion** = bets / total outflows (including bets)
- Dashed line at 0.5: light vs. heavy gamblers; L mean = 0.13

Gambling Frequency



- **Gambling frequency** = weeks with bets / total weeks observed
- Mean frequency in analytic sample: 0.52

How Gamblers Respond to Wins

Baseline Specification

$$Y_{it+\tau} = \beta_\tau \, win_{it} + \delta_{1\tau} \, bet_{it-1} + \delta_{2\tau} \, bet_{it-2} + \gamma_\tau \, Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

- Y_{it}: outcome (bets, consumption) for gambler i in week t
- win_{it}: gambling wins paid at the start of week t
- bet_{it-1}, bet_{it-2}: prior-week bets (critical controls)
- Z_{it-1}: inflows − wins, wealth, income, borrowings
- α_i, α_t: individual and week fixed effects
- β_τ: **marginal propensity out of unexpected wins**
- Dynamic specification: run for $\tau = -16, \ldots, 16$ (excl. -1)

Main Results: MPG and MPC

Marginal Propensity to Gamble

$$\hat{\beta}_0 = 0.075 \quad (\text{SE} = 0.005)$$

- Gamblers re-bet **7.5%** of unexpected wins within one week
- Without bet controls: $\hat{\beta}_0 = 0.26$ (overestimates by 3.5×)
- Adj. R^2 drops 0.58 → 0.49 without bet controls

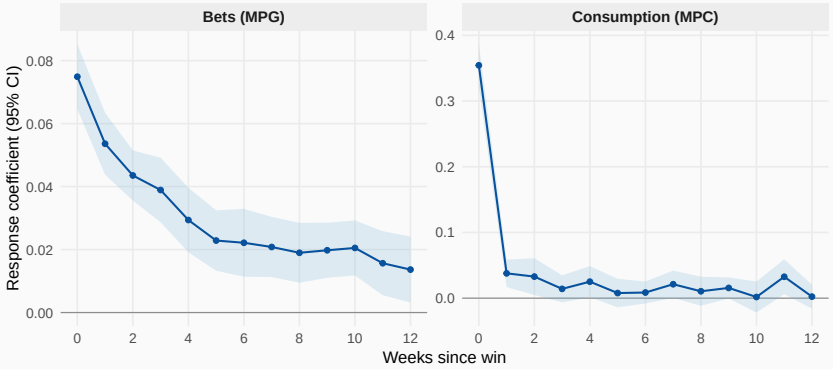
Marginal Propensity to Consume

$$\hat{\beta}_0 = 0.35 \quad (\text{SE} = 0.016)$$

- Gamblers spend **35%** of unexpected wins on consumption
- Robust to alternative measures (cash withdrawals, excl. financial txns)
- MPC ≈ 0.3 across all measures

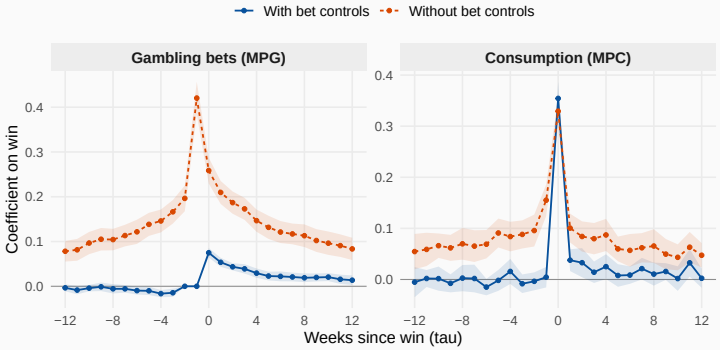
[MPG Table] [MPC Table] [Descriptive Stats]

Persistence Dynamics: MPG vs. MPC



- **MPG**: persists for ∼12 weeks (3 months)
- **MPC**: fades within ∼2 weeks
- Contrast in persistence = signature of source dependence

Dynamic Responses: With vs. Without Bet Controls



- Omitting prior-bet controls inflates MPG: $\hat{\beta}_0 = 0.26$ vs. 0.075 with controls
- Spurious persistence at negative τ: wins partly expected given prior bets
- MPC is similar across specifications

Source Dependence

Testing Source Dependence: Design

Key question: Is re-betting driven by *house money* or *gambler identity*?

Two tests:

1. Do the *same gamblers* treat gambling wins and a government transfer differently?
2. Do gamblers differ from non-gamblers in spending the *same* government transfer?

2020 Special Cash Payment (SCP):

- One-time transfer of ¥100,000 per person (COVID-19 pandemic)
- Staggered municipal disbursement $\Rightarrow$ exogenous timing
- 6,183 of 17,411 light gamblers received SCP through Mizuho

Source Dependence: Specifications

Test 1 — same gamblers, gambling wins vs. SCP:

$$Y_{it} = \beta_w \, win_{it} + \beta_s \, SCP_{it} + \delta_1 \, bet_{it-1} + \delta_2 \, bet_{it-2} + \gamma_0 \, Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

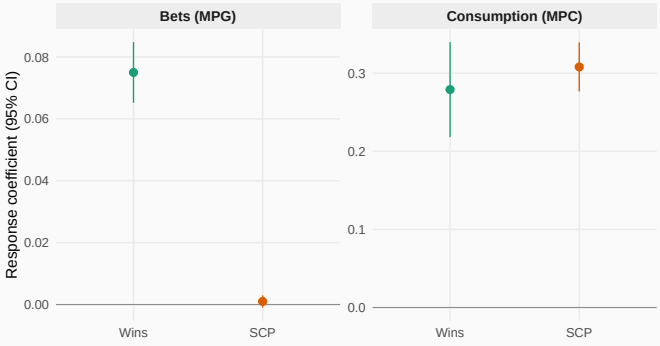
β_w: response to wins; β_s: response to SCP (within-individual comparison)

Test 2 — light gamblers vs. non-gamblers (Chiba, matched sample):

$$\begin{aligned} Y_{it} = {} & \beta_0 \, win_{it} + \delta_{10} \, bet_{it-1} + \delta_{20} \, bet_{it-2} \\ & + \psi_{SCP} \, SCP_{it} + \chi_{SCP} \, SCP_{it} \times \mathbb{I}_i^{\text{gambler}} + \gamma_0 \, Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it} \end{aligned}$$

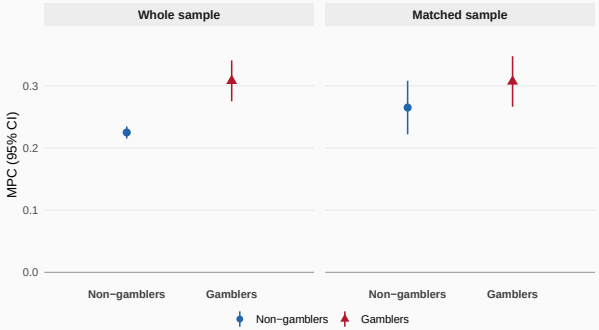
ψ_{SCP}: non-gambler SCP response; χ_{SCP}: gambler–non-gambler gap

Test 1: Same Gamblers, Different Windfalls



- MPG from wins: $\beta_w = 0.075$; MPG from SCP: $\beta_s = 0.001$ (n.s.)
- MPC from wins: 0.276; MPC from SCP: 0.308 (comparable)

Test 2: Gamblers vs. Non-Gamblers



- Raw comparison: gamblers spend 8.3% more of SCP (stat. significant)
- After propensity-score matching (age, wealth, income): gap shrinks to 4.2% (n.s.)
- **Light gamblers and matched non-gamblers spend the SCP at similar rates**

Source Dependence: Summary

	Gambling Wins	Gov't Transfer (SCP)
MPG (re-bet rate)	0.075^{***}	0.001 (n.s.)
MPC (consumption rate)	0.35^{***}	0.27^{***}
Persistence of MPG	$\sim$12 weeks	n/a
Persistence of MPC	$\sim$2 weeks	similar
Gambler vs. non-gambler	Matched MPC indistinguishable	
Gambler vs. non-gambler	Longer horizon (0-6) weeks indistinguishable	

$\Rightarrow$ **House money, not gambler type, drives re-betting**

[SCP Table]

Conclusion

Summary

Japanese horse racing gamblers + bank transaction data + A-PAT system. $\Rightarrow$ **House money drives re-betting. The danger is winning.**

1. **House money (MPG $= 0.075$):** Re-bet 7.5% of wins on impact; persists $\sim$12 weeks
2. **Consumption (MPC $= 0.35$):** 35% of wins spent on non-bet outflows; fades within 2 weeks
3. **Source dependence:** Government transfer barely re-bet (MPG ≈ 0); matched gamblers and non-gamblers spend it identically

Limitations:

- Data: JRA at Mizuho Bank only; no cash or cross-bank transactions; no health and employment outcomes
- Gambler classification is not literature supported

Future directions:

- Prospect theory: reference updating between bets
- Self-control problem: habit formation with mental accounting
- Extend to lotteries

Thank you

Appendix

Gambling in Japan: Market

Gambling market is large in Japan. 75% of respondents to a national survey in 2023 reported having gambled in the past year. Horse racing is considered the least gambling besides lotteries that having a problem gambling risk.

- Total gambling $\approx$ 2% of nominal GDP (2019)
- Three legal types: public races, lotteries, pachinko (pachinko is the dominant)
- Central horse racing: 28% share of public-race sales
- JRA Online betting: >85% of activity (2020s)
- Bets and wins through bank transfers are observable; cash at ticket booths is not
- Wins are *not* taxed at reimbursement

Back to Data

Identifying Gambling Transactions

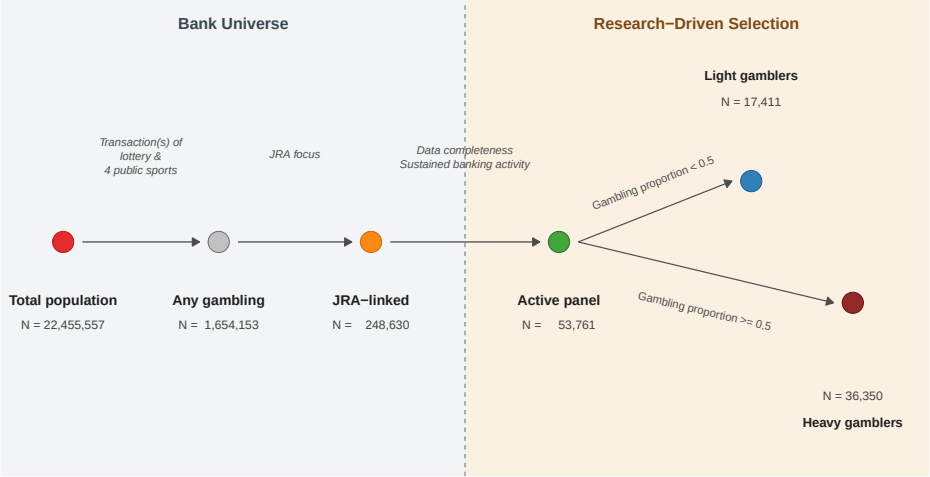
Three-step procedure in Mizuho ledger data:

1. **Keyword search** in Japanese transaction remarks + Transaction code (e.g. JRA/PAT purchase and return labels)
2. **Manual verification**; exclude non-gambling transfers (JRA to horse owner, etc.)
3. **Classify** inflows as wins and outflows as bets

- Focus on **online** central horse-race betting (JRA via A-PAT)
- **Consumption** = total outflows excluding gambling bets
- Weekly panel, Monday-to-Monday, 2019–2022

◂ Back to Data

Sample Selection



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Sample Construction (Detail)

- Start: 248,630 Mizuho customers with ≥ 1 JRA bet
- Selection criteria:
  - Both bets and wins for central horse races
  - Complete demographics; account opened before 2019
  - Weekly consumption $\leq$ ¥10M; positive consumption for $\geq$25 weeks
  - Gambling proportion $< 0.5 \Rightarrow$ **17,411 light gamblers**
  - Gambling proportion $\geq 0.5 \Rightarrow$ **36,350 heavy gamblers**
- Sample: 94% male; average age 60
- Balanced panel, bet, win and consumption takes 0 if no transactions.
- Gamblers are not necessary to bet/win/consume every week.

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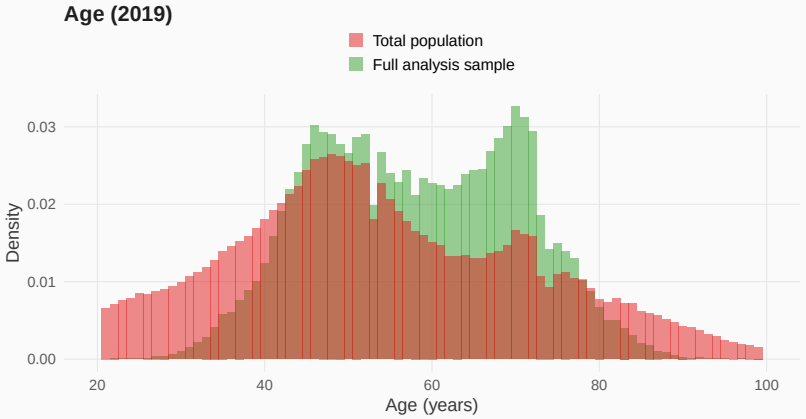
Bank Universe: Age



Full sample: light and heavy gamblers. JRA gambling is available to aged 20 and above. JRA gamblers are less younger and more elderly.

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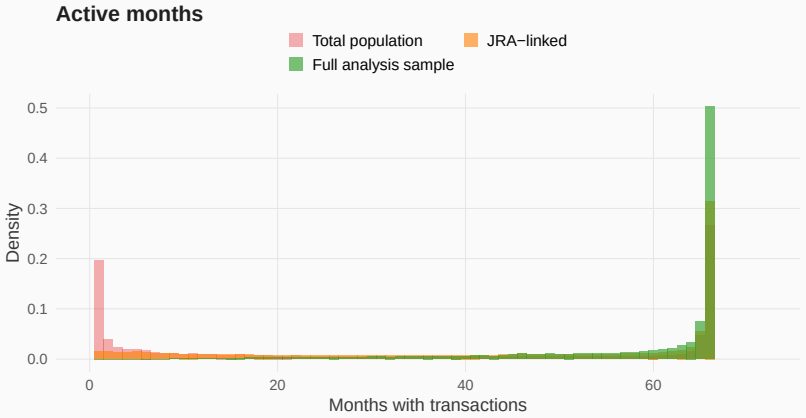
Bank Universe: Active Months



The 23M sample has many inactive accounts. Applying 25 weeks positive consumption filter removes inactive accounts and gambling specific accounts. The result is no different between months and weeks.

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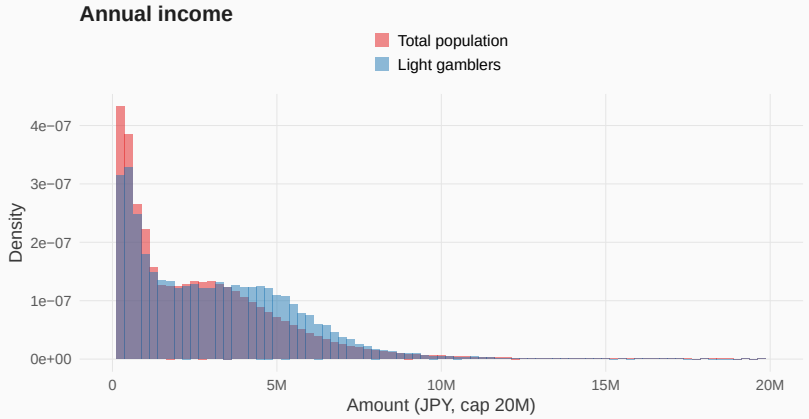
Bank Universe: Annual Income



Income distribution is different in left tail, right tail and middle rage between 4M and 6M. Accounts of 0 income are removed in both sample. The 0 income accounts are the dominant in both sample.

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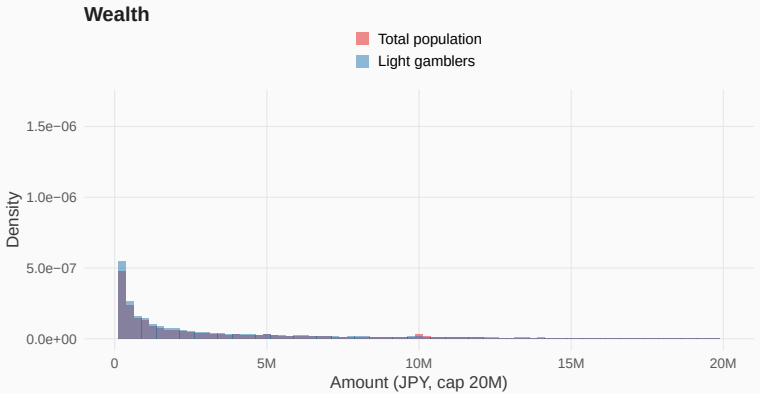
Bank Universe: Wealth



Wealth distribution: analysis sample skews higher than the general bank population.

Light gamblers: higher income, lower wealth and older than bank population

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Gambler Types and Annual Transitions

Classifying gamblers by annual gambling proportion:

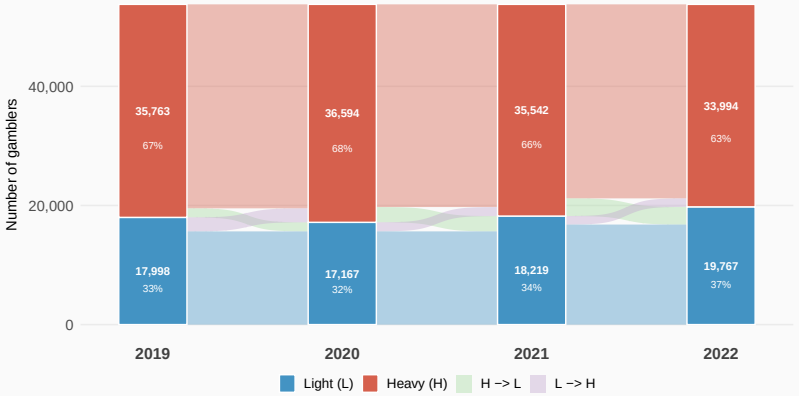
- **Heavy gambler** (H): gambling proportion > 0.5
- **Light gambler** (L): gambling proportion ≤ 0.5
- **Annual transition path (2019–2022)**: 16 possible paths ($HHHH$, $LLLL$, $LLHH$, ...)

Key patterns:

- 82% of gamblers never switch type: $HHHH$ (30,063) and $LLLL$ (14,317)
- Heavy gambling is sticky: 93% of H remain H year-to-year
- Light share grows slowly over the period (33% $\rightarrow$ 37%)
- Transition flows are small but consequential for long-run harm

Back to Data

Transition Paths: 2019–2022



N = 53,761. Light: gambling proportion <= 0.5; Heavy: > 0.5. Annual classification, 2019–2022.

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Additional Results

Past Outcomes: Overview

Question: How do prior gambling outcomes shape current betting and spending?

We extend the baseline regression with nonlinear terms (win^2, win^3) and threshold dummies (net win > 0; 100% loss) to test how past outcomes affect behavior.

Key findings:

1. **Break-even effect**: Bets jump discontinuously when net wins cross zero; gamblers prioritize betting when slightly ahead
2. **Loss-coping effect**: A 100% loss (¥10k bet, zero return) triggers a consumption spike, not more bets
3. **No loss-chasing**: Losses lead to *lower* subsequent bets; the A-PAT weekend lock may prevent impulsive re-betting

Past Outcomes: Specification

Extend the baseline regression with past gambling outcomes:

$$Y_{it} = \beta\, win_{it} + BX_{it} + \delta_1 bet_{it-1} + \delta_2 bet_{it-2} + \gamma Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

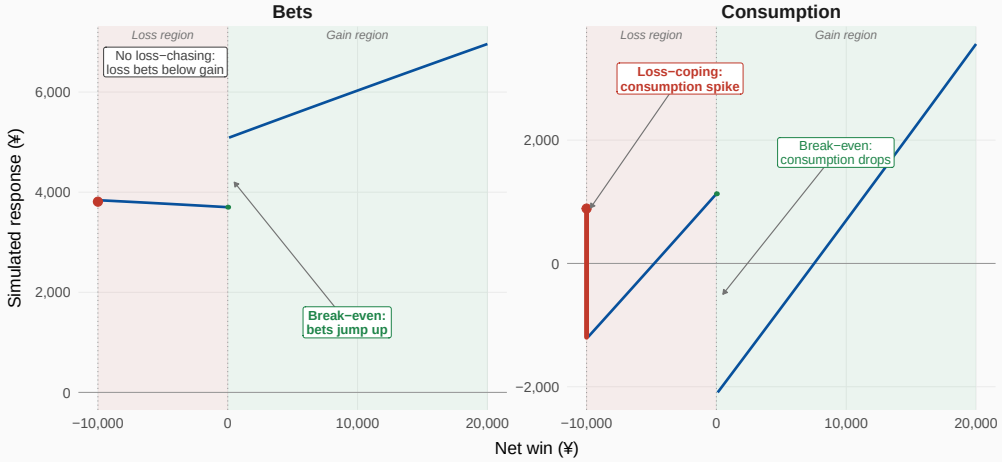
where X_{it} captures nonlinear and threshold effects:

- win_{it}^2, win_{it}^3; dummy: net win > 0; dummy: 100% loss ($bet_{it-1} > 0$, $win_{it} = 0$)
- Interactions: $win_{it}\times$ net-win dummy; $bet_{it-1}\times$ 100% loss dummy

Simulation (next slide): fix prior-week bet at ¥10,000; vary net win from $-$¥10,000 to $+$¥20,000

◂ Section Overview

Simulated Responses to Past Outcomes



- Fix prior bet at ¥10,000; vary net win from −¥10,000 (100% loss) to +¥20,000

Past Outcomes: Mechanisms

Break-even effect

- Bets jump when net wins turn positive; consumption drops at the same threshold
- *Prioritize betting* when slightly ahead; *prioritize spending* when slightly behind

No loss-chasing

- Negative net wins $\Rightarrow$ lower subsequent bets
- A-PAT cooldown may help: locks limit impulsive re-betting

Loss-coping effect

- ¥10,000 bet with zero win $\Rightarrow$ non-bet spending spike
- Driven by $bet_{t-1} \times$ 100% loss dummy
- Coping via leisure spending (dining, entertainment)

[Past Outcomes Table] ◂ Section Overview

Big Wins & Escalation: Overview

Question: How do big wins affect weekly re-betting and long-run gambling transitions?

We interact win with a large-win indicator (return ratio > 1.6, 90th percentile) and gambler-type dummies to examine short- and long-run effects.

Key findings:

1. Big wins raise weekly MPG with a **lag**: no on-impact spike, but significant from week 1 through week 12
2. For light gamblers, the big-win boost **grows over time** (significant from week 4)
3. Big wins drive L$\rightarrow$H transitions and raise future gambling proportion at **26–52 week** horizons
4. Heavy gamblers are trapped; light gamblers pulled in by big wins

Revisit MPG: Specification

Question: How do weekly re-betting responses differ by gambler type and large wins?

- $G_{it} = \mathbb{I}(RR_{it} > 1.6)$: **large-win** indicator (90th percentile of weekly return ratio)
- L_{it}: annual **light-gambler** indicator (gambling proportion < 0.5 in year t; heavy is baseline)

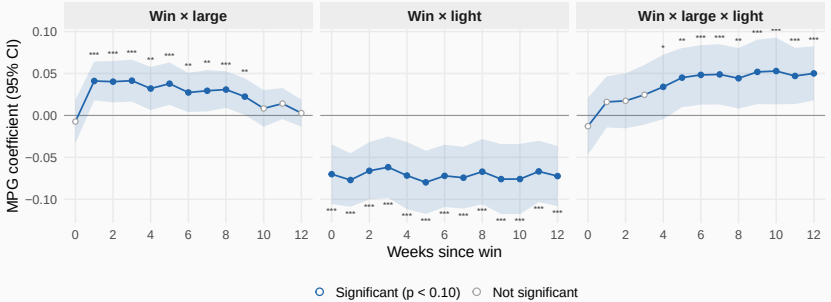
Extend the baseline MPG specification:

$$bet_{it+\tau} = \beta_{G,\tau}\, win_{it} \times G_{it} + \beta_{L,\tau}\, win_{it} \times L_{it} + \beta_{GL,\tau}\, win_{it} \times G_{it} \times L_{it} + \beta_{\tau}\, win_{it} + \delta_{1\tau}\, bet_{it-1} + \delta_{2\tau}\, bet_{it-2} + \gamma_{\tau}\, Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

- Estimated at each lead $\tau = 0, 1, \ldots, 12$

[On-Impact Comparison]

Dynamic MPG: Interaction Coefficients



Signif. codes: *** p < 0.01, ** p < 0.05, * p < 0.10. Filled markers: significant at 10%.

- Win × large (β_G): big wins raise MPG significantly from week 1 onward
- Win × light (β_L): light gamblers have persistently lower baseline MPG
- Win × large × light (β_{GL}): light gamblers' big-win boost grows and becomes significant from week 4

◂ Section Overview

Annual Transition: Specification

Question: Do weekly wins and bets predict annual changes in gambling intensity?

Outcomes (Y_{it}):

- **Moderating**: light gambler in year $t{+}1$ (L→L or H→L)
- **H→L, L→H**: directional transition indicators

Linear probability model:

$$Y_{it} = \beta\, win_{it} + \delta_1 bet_{it-1} + \delta_2 bet_{it-2} + \gamma Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

- β: change in Pr($Y{=}1$) per ¥10,000 win

◂ Section Overview

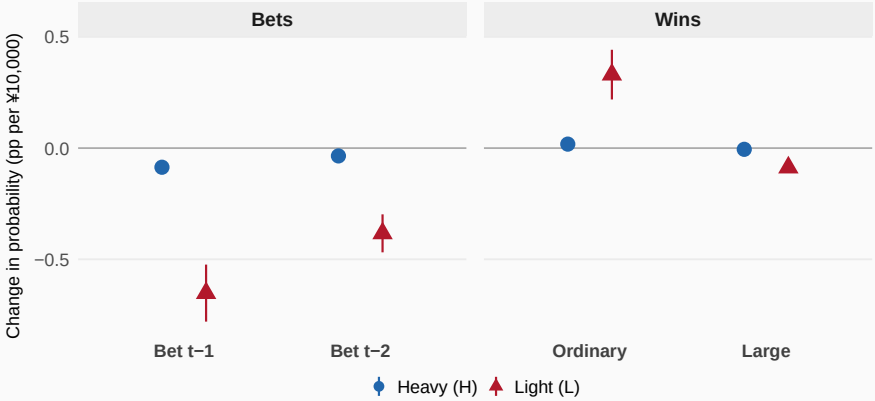
Moderating: Bets and Wins by Type

LPM coefficient × 100 (percentage points); per ¥10,000 increase

- Higher wins ⇒ lower moderation (house money pulls light gamblers in heavy category)

◂ Section Overview

Moderating: Ordinary vs. Large Wins

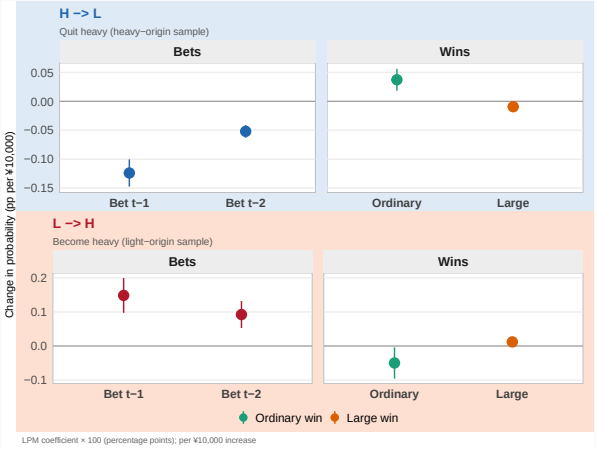


LPM coefficient × 100 (percentage points); per ¥10,000 increase

- Ordinary wins: moderate. Large wins: pull light gamblers in. Difference of wins' effects between H and L gamblers is significant.

Section Overview

Transition: H→L and L→H



Robustness check: using subsample of H and L gamblers. Same results verified.

◂ Big Wins Overview

Gambling Frequency Next Year

Dep. var.: Gambling frequency next year			
H, ordinary	*H*, large	*L*, ordinary	*L*, large
-0.0005^{***}	-0.00001	$+0.00010$	$+0.00012^{***}$
(0.00007)	(0.00002)	(0.00023)	(0.00003)

- Different dependent variables: next calendar year's gambling frequency
- Coefficient meaning: change in next-year frequency per ¥10,000 win regarding H/L type in the year and win size (ordinary vs. large)
- Heavy ordinary wins lower next-year frequency
- Large wins for light gamblers raises frequency

◂ Section Overview

Future Gambling Proportion: Specification

Question: Do wins raise the future gambling share differently by type and win size? Higher resolution results than annual transition path's → Understand how the affect is build up over time.

Same type × large-win interactions; new outcome is future gambling proportion:

$$Y_{it}^{(w)} = \beta_G \, win_{it} \times G_{it} + \beta_L \, win_{it} \times L_{it} + \beta_{GL} \, win_{it} \times G_{it} \times L_{it} + \beta \, win_{it} + \delta_1 bet_{it-1} + \delta_2 bet_{it-2} + \gamma Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

- $Y_{it}^{(w)}$: future bets / (future bets + future non-gambling outflows)
- Horizons w: 4, 13, 26, 52 weeks; differenced windows 5–26 and 27–52
- H/L type is an annual variable. Heavy gamblers with ordinary wins are the reference group.

◂ Section Overview

Future Gambling Proportion: Type × Large Win

	Dep. var.: Future gambling proportion					
	4 wks	13 wks	26 wks	52 wks	5–26 wks	27–52 wks
Win (β)	-0.0043^{***}	-0.0022^{***}	-0.0014^{***}	-0.0009^{***}	-0.0006^{***}	-0.0004^{***}
Win × large (β_G)	-0.0014^{***}	-0.0007^{***}	-0.0002	$+0.0002^{*}$	$+0.0012^{***}$	$+0.0008^{***}$
Win × light (β_L)	$+0.0032^{***}$	$+0.0006^{**}$	-0.0008^{***}	-0.0012^{***}	-0.0016^{***}	-0.0011^{***}
Win × large × light (β_{GL})	-0.0006	-0.0002	$+0.0002$	$+0.0004^{**}$	$+0.0008^{***}$	$+0.0007^{***}$

- β: H+ordinary wins (reference group); β_G: difference in H+large wins; β_L: difference in L+ordinary wins; β_{GL}: difference in L+large wins;
- Ordinary wins reduce future gambling proportion for both types. Large wins for light gamblers: insignificant at short horizons; **positive at 5–26 and 27–52 weeks**
- Escalation is gradual, consistent with the dynamic MPG pattern

◂ Section Overview

Gambling Intensity: Method

Goal: Robustness check: how MPG and MPC vary with intensities?

Two intensity measures: (Sample period measure)

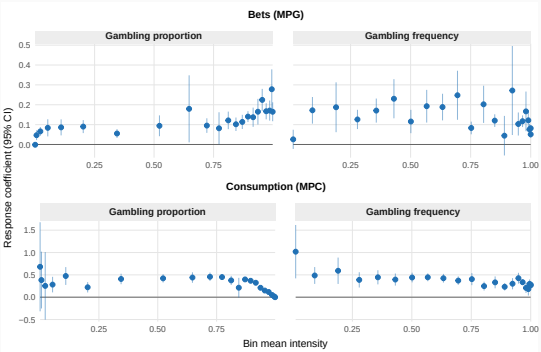
- **Gambling proportion** = bets / total outflows (including bets)
- **Gambling frequency** = weeks with bets / weeks observed

Procedure:

1. Sort gamblers into evenly sized bins by proportion or by frequency
2. Run the baseline regression separately within each bin
3. Plot bin-level β_0 for bets (MPG) and consumption (MPC), with 95% CIs

Includes heavy gamblers (proportion ≥ 0.5). Figure shows every fifth bin for readability.

MPG and MPC across Gambling Intensity



- MPG and MPC are **stable** across gambling intensity
- Exception: heavy gamblers (proportion > 0.75) show mechanical shifts

A Simple Model of Heterogeneous Gamblers

Two-period model: gambler i maximizes

$$V = u(c_1) + \kappa_i \, v(g) + \beta_i \, \mathbb{E}[u(c_2)]$$

subject to $c_1 + s + g = y$ and $c_2 = Rs + \theta g$

Gambling return: $\theta \in \{\theta^L, \theta^H\}$ with $\Pr(\theta = \theta^H) = \pi^H$; assume $\theta^L/R < 1 < \theta^H/R$

- Heterogeneity in β_i (patience), κ_i (love of gambling), and optionally (π_i^H, θ_i^H) (optimism/skill)
- Log utility: $u(c) = \log(c)$, $v(g) = \log(g)$

Key properties:

1. MPC $= \dfrac{1}{1 + \beta_i + \kappa_i} \Rightarrow$ decreasing in β_i, κ_i
2. MPG ≥ 0; increasing in κ_i, decreasing in β_i when $\kappa_i > 0$
3. (π_i^H, θ_i^H) heterogeneity shifts MPG but not MPC

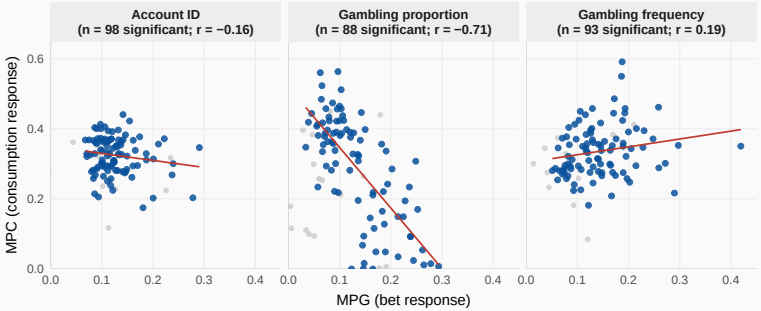
What Drives Heterogeneity? Model Predictions

The sign of the **MPG-MPC correlation** reveals the dominant source:

Source of heterogeneity	MPG	MPC	Correlation
β_i (patience)	$\downarrow$ when $\beta_i \uparrow$	$\downarrow$ when $\beta_i \uparrow$	**Positive**
κ_i (gambling preference)	$\uparrow$ when $\kappa_i \uparrow$	$\downarrow$ when $\kappa_i \uparrow$	**Negative**
π_i^H or θ_i^H (skill/optimism)	varies	unchanged	**Zero**

- If β_i dominates: patient gamblers save more, gamble less, consume less $\Rightarrow$ MPG and MPC move together
- If κ_i dominates: gambling-lovers allocate more to bets, less to consumption $\Rightarrow$ MPG and MPC move oppositely

Empirical MPG-MPC Correlation



- Grouped by account ID (100 groups): correlation $= -0.30$ ($p = 0.009$)
- Grouped by gambling proportion: -0.04 (n.s.); by frequency: 0.09 (n.s.)
- Negative correlation supports **gambling preference** (κ_i) as the dominant source

The Role of Liquidity Constraints

$$Y_{it} = \beta\, win_{it} + \phi\, win_{it} \times X_{it-1} + \delta_1\, bet_{it-1} + \delta_2\, bet_{it-2} + \gamma\, Z_{it-1} + \alpha_i + \alpha_t + \varepsilon_{it}$$

where X_{it-1}: wealth or liquidity-constraint dummy (wealth $<$ monthly income)

MPC (consumption)

- $\phi < 0$ for wealth: lower wealth $\Rightarrow$ higher MPC
- $\phi > 0$ for liquidity dummy: constrained individuals spend more
- Widely observed pattern, our results is consistent with the literature.

MPG (bets)

- ϕ is **insignificant** across all specifications
- Liquidity constraints do *not* affect bet amounts
- But: constrained gamblers are more likely to *participate* (extensive margin)

◂ Section Overview

Liquidity Constraints: Key Results

Interaction ϕ ($win \times X$)	**Wealth**	**Liq. constraint**
MPC (consumption)	-0.0001^{***}	0.067^{**}
MPG (bets)	-0.000	-0.007

- **MPC:** lower wealth or liquidity constraint $\Rightarrow$ higher spending out of wins
- **MPG:** no effect on bet amounts; constrained gamblers more likely to participate when wins rise (extensive margin). This result suggests JRA gamblers does not gamble because of unmet liquidity needs. (Herskowitz (2021))

[Full regression table] ◂ Section Overview

Regression Tables

Descriptive Statistics on Gamblers

	10%	25%	50%	75%	90%	mean	SD
Account-Week Observations			*Sample size: 3,551,844*				
Consumption	0	0	0.700	5.716	16.462	6.305	21
Consumption exc FT	0	0	0.300	4	12.900	5.158	20
Gambling participation dummy	0	0	1	1	1	0.518	0.500
Gambling bets	0	0	0.040	0.600	1.830	0.705	2.400
Gambling wins	0	0	0	0.133	1.204	0.564	4
Return ratio	0	0	0.223	0.844	1.592	0.736	4.300
Interval between bets	1	1	1	1	2	1.656	3.600
100% loss dummy	0	0	0	1	1	0.429	0.490
Net win dummy	0	0	0	0	1	0.195	0.400
Account-Month Observations			*Sample size: 295,987*				
Wealth	0.300	4.600	39.900	239.200	801.500	272.410	680
Borrowing	0	0	0	0	29.900	87.780	410
Annual income	0	0	116	441.500	618.500	248.764	880
Liquidity constraint dummy	0	0	0	0	0	0.077	0.270
Account Observations			*Sample size: 17,411*				
Age	43	48	58	69	75	58.480	12
Proportion of gambling	0.003	0.015	0.071	0.217	0.374	0.131	0.140
Frequency of gambling	0.054	0.177	0.502	0.887	0.985	0.521	0.350
Gender		Male:	16,335	94%	Female:	1,076	6%

Unit: 10,000 JPY.

◂ MPG & MPC Results ◂ MPG Table ◂ MPC Table ◂ Back to Summary

Estimation of the MPG

	Dependent variable:				
	Bets		EM	EM (Continue)	IM
	(1)	(2)	(3)	(4)	(5)
Win_t	0.075***	0.258***	0.002***	0.002***	0.068***
	(0.005)	(0.014)	(0.0003)	(0.0003)	(0.005)
Bet_{t-1}	0.333***		0.019***	0.018***	−0.651***
	(0.013)		(0.001)	(0.001)	(0.014)
Observations	3,545,303	3,562,773	3,545,303	2,098,627	2,070,597
Adjusted R^2	0.584	0.488	0.531	0.359	0.276
Time fixed effect	Yes	Yes	Yes	Yes	Yes
Individual fixed effect	Yes	Yes	Yes	Yes	Yes
Bet Controls	Yes	No	Yes	Yes	Yes

Bet controls: bet_{t-1}, bet_{t-2}, $inflow_{t-1}$. Other controls: wealth, borrowings, annual income.
EM: gambling participation dummy. EM (Continue): repeat gambling dummy. IM: change in bets conditional on positive bets.

*p<0.1; **p<0.05; ***p<0.01.

◂ MPG & MPC Results ◂ MPC Table ◂ Descriptive Stats ◂ Back to Summary

Estimation of the MPC

	Dependent variable:			
	Consumption		Cash withdrawals	Consumption exc fin transfers
	(1)	(2)	(3)	(4)
Win_t	0.354^{***}	0.329^{***}	0.300^{***}	0.349^{***}
	(0.016)	(0.015)	(0.014)	(0.017)
Bet_{t-1}	-0.120^{***}		-0.162^{***}	-0.126^{***}
	(0.029)		(0.019)	(0.029)
Observations	3,533,125	3,550,535	3,533,125	3,533,125
Adjusted R^2	0.155	0.146	0.196	0.137
Bet Controls	Yes	No	Yes	Yes

Bet controls: bet_{t-1}, bet_{t-2}, $inflow_{t-1}$. Other controls: wealth, borrowings, annual income.

$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

◂ MPG & MPC Results ◂ MPG Table ◂ Descriptive Stats ◂ Back to Summary

MPC Comparison between Gamblers and Non-Gamblers

	Dependent variable:			
	Consumption			Bets
	Whole	0–6 weeks Whole	Matched	
Wins	0.279***	0.403***	0.276***	0.075***
	(0.031)	(0.072)	(0.030)	(0.005)
SCP	0.225***	0.358***	0.265***	0.001
	(0.005)	(0.015)	(0.022)	(0.001)
SCP × Is Gambler	0.083***	0.034	0.042	
	(0.016)	(0.036)	(0.026)	
Observations	46,673,454	32,689,743	2,510,035	3,533,529
Adjusted R^2	0.055	0.192	0.113	0.586

SCP: 100,000 JPY per person. "Matched": propensity-score-matched Chiba residents.

*p<0.1; **p<0.05; ***p<0.01.

◂ Source Dependence Results ◂ MPG Table ◂ MPC Table ◂ Back to Summary

MPG and MPC Dependence on Past Gamble Outcomes

	Dependent variable:				
	Bets	EM	EM (Continue)	IM	Consumption
	(1)	(2)	(3)	(4)	(5)
Win	−0.013	0.022***	0.020***	−0.024	0.233***
	(0.027)	(0.001)	(0.001)	(0.029)	(0.047)
Bet_{t-1}	0.384***	0.017***	0.019***	−0.650***	−0.122***
	(0.017)	(0.001)	(0.001)	(0.018)	(0.038)
Bet_{t-2}	0.222***	0.010***	0.003***	0.192***	0.082***
	(0.010)	(0.001)	(0.001)	(0.013)	(0.023)
Win^2	−0.001	−0.0005***	−0.0004***	−0.0003	0.002***
	(0.001)	(0.00002)	(0.00002)	(0.001)	(0.001)
Win^3	0.00000	0.00000***	0.00000***	−0.00000	−0.00001
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Dum:100%Loss	0.033*	0.191***	0.206***	0.006	−0.136***
	(0.017)	(0.002)	(0.002)	(0.028)	(0.045)
Dum:NetWin	0.027	0.205***	0.208***	−0.021	−0.368***
	(0.027)	(0.003)	(0.003)	(0.034)	(0.056)
Win×Dum:NetWin	0.111***	−0.007***	−0.008***	0.113***	0.043
	(0.019)	(0.001)	(0.001)	(0.020)	(0.033)
Bet_{t-1}×Dum:100%Loss	−0.036	−0.002	−0.003**	0.003	0.347***
	(0.034)	(0.002)	(0.001)	(0.038)	(0.062)
Observations	3,533,529	3,533,529	2,098,627	1,813,815	3,533,529
Adjusted R^2	0.586	0.556	0.407	0.306	0.155

*p<0.1; **p<0.05; ***p<0.01.

◂ MPG Table ◂ Past Outcomes

MPG/MPC and Liquidity Constraint

	Dependent variable:					
	Bets			Consumption		
	(1)	(2)	(3)	(4)	(5)	(6)
Liquidity constraint dummy		-0.084^{***}	-0.083^{***}		-1.633^{***}	-1.612^{***}
		(0.016)	(0.016)		(0.110)	(0.112)
Its cross term		-0.007	-0.009		0.067^{**}	0.042
		(0.012)	(0.012)		(0.027)	(0.028)
Wealth	0.0001^{***}	0.0001^{***}	0.0001^{***}	0.007^{***}	0.007^{***}	0.007^{***}
	(0.00003)	(0.00002)	(0.00003)	(0.001)	(0.001)	(0.001)
Its cross term	-0.00000		-0.00000	-0.0001^{***}		-0.0001^{**}
	(0.00001)		(0.00001)	(0.00002)		(0.00002)
Observations			3,533,125			
Adjusted R^2	0.584	0.584	0.584	0.155	0.155	0.155

Cross term: $win_{it} \times X_{it-1}$. Liquidity constraint: wealth $<$ monthly income.

*p$<$0.1; **p$<$0.05; ***p$<$0.01.

◂ MPG Table ◂ MPC Table ◂ Heterogeneity

Specification Consistency: On-Impact Comparison

	(1) Baseline *light only*	(2) Pooled *whole sample*	(3) Interactions *whole sample*
Win ($\hat{\beta}$)	0.075^{***}	0.121^{***}	0.141^{***}
Win × large			-0.007
Win × light			-0.070^{***}
Win × large × light			-0.013
Individuals	17,411	53,761	53,761
R^2	0.584	0.617	0.618

- **Sample**: including heavy gamblers raises MPG from 0.075 to 0.121
- **Specification**: interactions barely move fit (R^2: 0.617 → 0.618) or baseline MPG
- **Baseline check**: light MPG is $0.141 - 0.070 = 0.071$ (close to the baseline 0.075)

◂ Big Wins Overview