The Meter and the Membership: Flat-Rate Bias, the Taxi-Meter Effect, and the Economics and Psychology of Continuous Payment

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Abstract

People dislike watching a meter run. They will pay a premium to convert a per-minute, per-unit, or per-second charge into a flat fee, a bundle, or a membership — and, having done so, will consume more and feel better about it, even when the meter would have been cheaper. This report surveys the large and scattered literature on that pattern, which spans behavioral economics, marketing science, and industrial organization. Its organizing objects are the *flat-rate bias* — the documented tendency to choose flat tariffs that cost more than a pay-per-use alternative would have cost given one's actual consumption — and the *taxi-meter effect* — the hedonic drag of a running charge on the pleasure of consuming. We assemble a vocabulary, a two-axis taxonomy (of pricing structures and of causal mechanisms), and a catalogue of fifteen domains in which the phenomenon recurs, from gym memberships and mobile-data plans to Disneyland admission, all-you-can-eat buffets, streaming, cloud computing, tolls, and ski passes. We then lay out the competing theories — rational insurance and option value; biased beliefs about usage; the hedonic mental-accounting family (pain of paying, payment decoupling, the zero-price effect); reference-dependent loss aversion; and self-control and commitment — with their evidence and counterevidence. Three conclusions organize the material. First, the phenomenon is **real and robust**: up to 46.6% of internet subscribers are flat-rate biased and more than half of them overpay by 100% or more (Lambrecht and Skiera, 2006), while gym members on flat contracts pay over $17 for visits that a pass would price at $10 and forgo about $600 over a membership (DellaVigna and Malmendier, 2006). Second, it is **over-determined**: at least five mechanism-families each predict flat-rate preference, they are observationally similar, and separating them is the field's central difficulty. Third, it is **not universal**: a mirror-image pay-per-use bias exists, metered pricing is sometimes preferred for self-control or budgeting, and the truly general variable is not flat-versus-metered

but the *salience and coupling of payment*. We close with implications for consumers, firms, and regulators, and with the question of what algorithmic, real-time pricing will do to a species that hates the meter.

Contents

1 Introduction

Consider two ways to charge for the same thing. A ride-hailing app could bill you for every second you keep the driver waiting — the meter ticking up in real time on your screen — or it could let the first five minutes pass for free and then apply a flat $5 penalty. A streaming service could charge a few cents per episode, metered to the minute, or a flat $15.99 a month for as much as you can watch. A gym could sell you a visit at a time, or a membership. In each pair the two structures can be arranged to collect the very same amount of money from the very same customer. Yet people do not treat them as equivalent. They dislike the meter, sometimes intensely, and will pay real money to be rid of it — and firms, knowing this, increasingly sell the absence of a meter as a feature.

This is a puzzle for the standard economic account of the consumer, in which only the total amount paid, weighed against the value received, should matter. The structure of payment — whether the same dollars arrive as many small increments or one lump, at the moment of consumption or buffered away from it, as a salient charge or an invisible one — is supposed to be a matter of arithmetic, not of preference. But it is a matter of preference, and a strong one. Lambrecht and Skiera (2006), studying the tariff choices of German internet subscribers, gave the phenomenon its name and its clearest demonstration: a large share of consumers choose a flat rate that costs them more than a metered plan would have, given what they actually use, and — crucially — they do not regret it. They titled their paper *Paying Too Much and Being Happy About It*.

The same authors also named the mechanism that this report takes as its emblem. A usage-based price, they observed, imposes a psychic cost quite apart from the money: "the ticking of the taxi meter reduces the pleasure of a taxi ride."[1] Every unit consumed under a meter is a small, salient act of paying; a flat rate abolishes the meter and lets consumption feel free. The taxi-meter effect is the demand-side twin of a result from the study of free goods — that a price of zero is not merely low but affectively special (Shampanier et al., 2007) — and it is why a flat rate is worth paying a premium for: it does not just make the marginal unit cheap, it makes it feel like it costs nothing.

The purpose of this report is to gather, organize, and adjudicate the literature on this cluster of phenomena, which is unusually scattered across fields that rarely cite one another: the behavioral-economics work on mental accounting and self-control, the marketing-science work on tariff choice and payment psychology, and the industrial-organization work on nonlinear pricing and two-part tariffs. We proceed as follows. Section 2 fixes a vocabulary and draws the crucial distinction between a *choice* bias (picking the wrong

[1] The phrase, and the label *taxi-meter effect*, are from Lambrecht and Skiera (2006), who ground the mechanism in the pain-of-paying and mental-accounting work of Prelec and Loewenstein (1998) and Soman (2001).

tariff) and a *hedonic* effect (the meter spoiling consumption). Section 3 builds a two-axis taxonomy: of the pricing structures themselves, arrayed from pure meter to pure membership, and of the causal mechanisms proposed to explain the preference between them. Section 4 catalogues fifteen real-world domains where the pattern appears, with the best-documented facts for each. Section 5 is the analytical core: a theory-by-theory treatment of the five mechanism-families, each with its prediction, its supporting evidence, and its counterevidence. Section 6 pulls the quantitative threads together. Section 7 draws out the consequences for individual consumers, for firms designing prices, and for regulators. Section 8 discusses scope conditions, the mirror-image pay-per-use bias, and the future of metering in an age of algorithmic pricing.

Three theses run through the report. The first is that the phenomenon is **real and robust**, documented in field data, laboratory experiments, and the pricing histories of whole industries. The second is that it is **over-determined**: no fewer than five distinct mechanisms — rational insurance, biased beliefs, hedonic decoupling, loss aversion, and self-control — each independently predict a preference for flat rates, and because they make similar predictions, the empirical project of separating them is genuinely hard and largely unfinished. The third is that the phenomenon is **not universal**: there is a mirror-image *pay-per-use bias*, metered pricing is sometimes actively preferred (as a brake on consumption or an aid to budgeting), and the deepest variable is therefore not the flat-versus-metered contrast itself but the *salience and coupling of payment* of which that contrast is one instance.

2 Defining the Phenomenon: A Vocabulary

The literature's terms were coined by different fields for different purposes and are often used loosely. Table 1 fixes the senses used in this report. Two distinctions deserve emphasis before the taxonomy.

The first is between a **choice bias** and a **hedonic effect**. The flat-rate bias, strictly, is a statement about tariff *choice*: a consumer is flat-rate biased if, given the distribution of usage they actually go on to realize, they would have paid less under an available metered tariff than under the flat tariff they chose (Lambrecht and Skiera, 2006). This is a claim about a decision, and it can be wrong in the consumer's favor or against it. The taxi-meter effect, by contrast, is a statement about *experience*: holding money constant, consumption is less pleasant when it is metered. The two are logically independent — one could have either without the other — but they are causally linked, because a consumer who anticipates the hedonic drag of the meter will rationally pay something to avoid it, converting an experience effect into a choice. Much of the confusion in the literature comes from running the two together.

The second distinction is between **a bias and a rational premium**. That a consumer pays more under a flat rate than a metered plan *would have* cost is not, by itself, evidence of a mistake. A flat rate delivers something a metered plan does not — insurance against a variable bill, freedom from monitoring, the option to consume without friction — and a rational consumer may pay for those things. The word "bias" in "flat-rate bias" is therefore a term of art, naming a pattern (ex-post overpayment relative to a feasible alternative) that *may* reflect a genuine error or *may* reflect a rational purchase of intangibles. Disentangling the two is the burden of Section 5.

Table 1: A working vocabulary

Term	**Sense used here**
Flat-rate bias	Choosing a flat tariff that costs more than an available pay-per-use tariff would, given one's realized usage (Lambrecht and Skiera, 2006). A *choice* pattern, not necessarily an error.
Pay-per-use bias	The mirror image: choosing a metered tariff when a flat rate would have been cheaper given realized usage.
Taxi-meter effect	The hedonic cost a running, usage-based charge imposes on the pleasure of consumption; "the ticking of the taxi meter reduces the pleasure of a taxi ride" (Lambrecht and Skiera, 2006). An *experience* effect.
Pain of paying	The immediate, affective displeasure of parting with money, distinct from its opportunity cost; coined by Zellermayer (1996), developed by Prelec and Loewenstein (1998) and Rick et al. (2008).
Coupling / decoupling	The degree to which a payment is psychologically associated with the consumption it funds. Metered pricing tightly couples them; flat rates and prepayment decouple them (Prelec and Loewenstein, 1998; Thaler, 1999).
Payment salience	How noticeable a payment is at the point of consumption. Meters are maximally salient; automatic, decoupled payment (autopay, E-ZPass) minimally so (Soman, 2001; Finkelstein, 2009).
Zero-price effect	The disproportionate, affectively charged appeal of a price of exactly zero (Shampanier et al., 2007); a flat rate sets the marginal price to zero.

Table 1 — continued

Term	Sense used here
Two-part tariff	A price with a lump-sum access fee plus a per-unit usage price (Oi, 1971). Pure metered and pure flat are its limiting cases.
Three-part tariff	An access fee, a free allowance, and an overage price beyond it; the standard mobile-plan shape (Grubb, 2009).
Nonlinear pricing	Any schedule in which the average price varies with quantity — block tariffs, quantity discounts, bundles (Wilson, 1993).

3 A Taxonomy of the Phenomenon

The subject has two natural axes: the space of *pricing structures* over which the preference is expressed, and the space of *mechanisms* proposed to explain it.

3.1 Pricing structures: from the meter to the membership

Figure 1 arrays the main pricing structures along the dimension that matters psychologically: the salience of the marginal price at the moment of consumption. At one pole is **pure metering** — pay per unit, the meter running with every unit consumed, the marginal price felt in full. At the other is the **flat rate** or all-you-can-use membership — one price, a marginal price of exactly zero, no meter at all. Between them lie the hybrids. The **two-part tariff** (Oi, 1971) adds a lump access fee to a per-unit price, so the meter still runs but part of the payment is sunk and detached from use. **Block** or tiered pricing steps the unit price up or down with quantity. The **three-part tariff** — an access fee, an included allowance, and an overage rate — sets the marginal price to zero *within* the allowance and then to a often-painful positive number beyond it, which is why it produces "bill shock" (Grubb, 2009; Grubb and Osborne, 2015). Bundling, in which many goods are sold for one price (Bakos and Brynjolfsson, 1999), is an orthogonal move that further hides the marginal cost of any single item. The psychological gradient runs monotonically: the further right on Figure 1, the less a consumer feels the meter, and the more the marginal unit feels free.

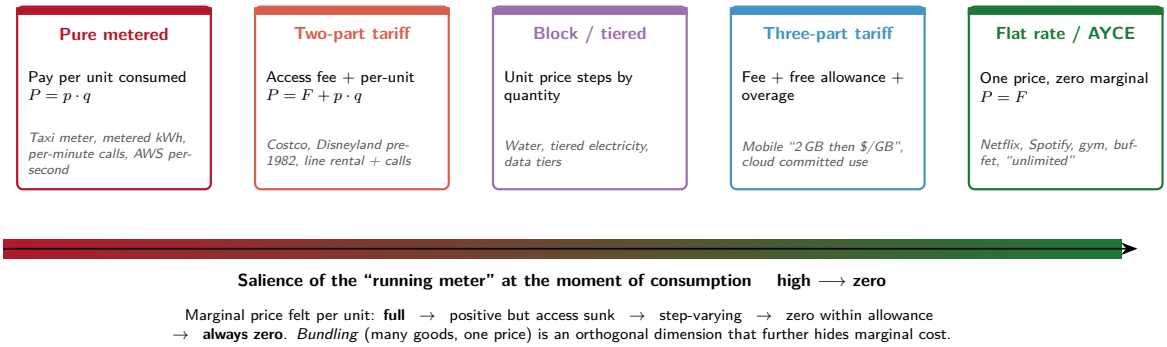

Figure 1: A taxonomy of pricing structures, arrayed by the salience of the marginal price at the moment of consumption — from the fully-felt meter (left) to the flat membership whose marginal price is always zero (right). Bundling is an orthogonal dimension that further hides marginal cost.

3.2 Mechanisms: rational and behavioral, choice and experience

Figure 2 organizes the proposed explanations. Two cross-cutting distinctions structure them. The first is **rational versus behavioral**: some mechanisms (insurance against bill variance, the option and convenience value of not metering) make flat-rate preference fully consistent with standard preferences, while others (biased beliefs, the pain of paying, loss aversion, naïve present bias) invoke departures from that model. The second is **choice versus experience**: some mechanisms operate on the ex-ante selection of a tariff (why you *buy* the flat plan), others on the in-the-moment hedonics of consumption (why the meter *feels* bad), and some on both. Cutting across all of them is **salience**: every mechanism is amplified when the charge is visible and repeated, and muted when payment is automatic and decoupled — which is why the same person who resents a taxi meter barely notices an E-ZPass toll (Finkelstein, 2009).

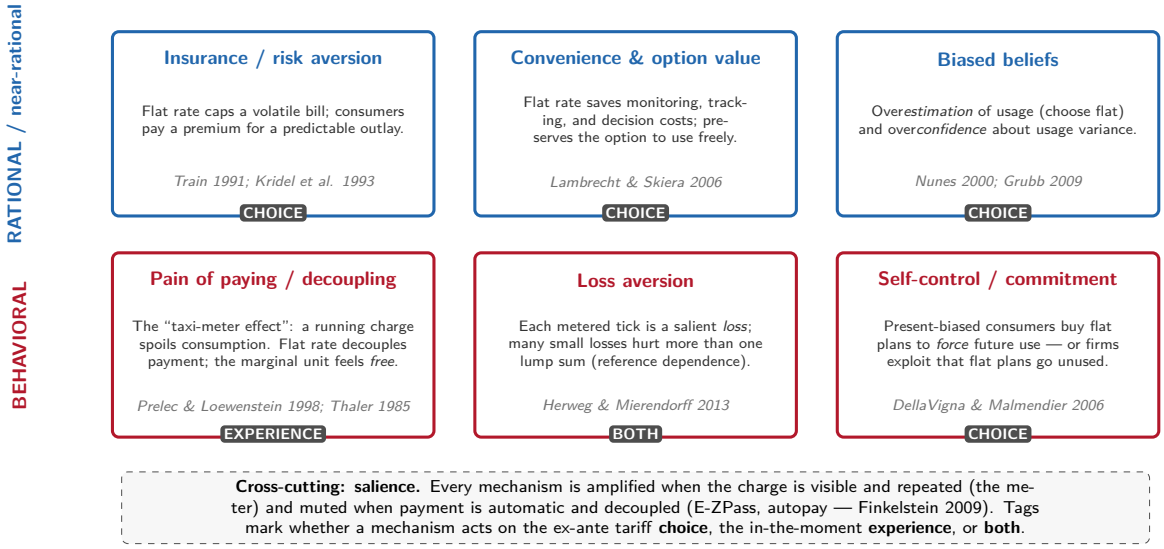

Figure 2: A taxonomy of the mechanisms proposed to explain flat-rate preference and meter aversion, split into rational (blue) and behavioral (red) families and tagged by whether each acts on the ex-ante tariff *choice*, the in-the-moment *experience*, or both. Salience is a cross-cutting amplifier.

The rest of the report is built on these two figures: Section 4 populates the structural axis with real cases, and Section 5 works through the mechanism axis one family at a time.

4 The Domain Catalogue: Where the Meter Appears

The flat-versus-metered choice is nearly ubiquitous once one starts to look. Table 2 catalogues fifteen domains, each with its metered form, its flat-or-bundled alternative, and the best-documented fact attached to it. Several reward a closer look.

Table 2: A catalogue of domains where flat/bundled pricing competes with metered/continuous pricing

Domain	**Metered / continuous**	**Flat / bundled**	**Key documented fact**
Amusement parks	Per-ride A–E coupon books	Unlimited "Passport" pass	Disneyland's A–E ticket books ran from 1955 (E-ticket, 1959); coupons gone by June 1982.

Table 2 — continued

Domain	Metered / continuous	Flat / bundled	Key documented fact
Gyms / health clubs	Pay-per-visit (10-visit pass)	Flat monthly membership	Flat-fee members pay >$17 per visit vs. $10 on a pass; forgo ∼$600 per membership (DellaVigna and Malmendier, 2006).
Telephony / mobile	Per-minute, per-GB, plus overage	"Unlimited" plans	AT&T ended unlimited data June 2010; carriers reintroduced unlimited by 2017; FCC/CTIA bill-shock alerts, 2011.
Internet access	Dial-up per hour; broadband caps	Flat unlimited	AOL's $19.95/mo unlimited (1 Dec. 1996) doubled usage and jammed the network into busy signals.
Streaming (video, music)	Per-title, per-song ($0.99+)	Flat subscription	Netflix replaced per-title rental and late fees with a flat plan by 2000; music went flat (Spotify) vs. iTunes downloads.
Cloud / SaaS	Usage / consumption ("pay-as-you-go")	Per-seat or flat subscription	∼3 in 5 SaaS firms used usage-based pricing by 2023; "bill shock" is the named churn risk (Grubb and Osborne, 2015).
Electricity	Time-of-use / real-time dynamic	Flat or tiered per-kWh	Opt-in dynamic pricing draws ∼1% enrollment vs. near-100% under opt-out defaults; consumers resist the meter.
Water	Volumetric per-m^3 meter	Flat / rateable-value charge	UK unmetered homes billed on 1990 rateable values; a 12–24 month trial lets households revert from the meter.
Tolls / congestion	Cash per crossing; charge per entry	E-ZPass transponder; cordon pass	Electronic collection makes tolls 20–40% higher by cutting salience (Finkelstein, 2009); NYC congestion pricing live 5 Jan. 2025.
Taxis / ride-hail	Taximeter (time + distance)	Flat airport fare; Uber upfront quote	Taximeter patented 1891; Uber "upfront pricing" (2016) replaced the running estimate; wait-time billed per minute after a grace period.
Restaurants	À la carte; by weight	Prix-fixe / tasting menu; buffet	Flat/AYCE sets marginal price to zero; prepaid fees raise consumption (Arkes and Blumer, 1985; Just and Wansink, 2011).

Table 2 — continued

Domain	Metered / continuous	Flat / bundled	Key documented fact
Ski / theme-park passes	Single-day lift tickets ($339–356)	Multi-mountain season pass	Epic Pass launched 2008, Ikon 2018; operators aim to push ≥75% of visitors onto prepaid passes.
All-inclusive travel	Cruise pay-per-item (drinks, Wi-Fi)	All-inclusive one price	Club Med invented the all-inclusive resort (1950) explicitly to eliminate the per-item charges that "sour" a holiday.
Software licensing	Perpetual license (buy once)	Recurring subscription	Adobe killed perpetual licenses for Creative Cloud (2013); ∼96% subscription revenue by FY2025 despite a ∼50,000-signature backlash.
Parking / coworking / print / roaming	Per-hour, per-day, per-page, per-MB	Monthly permit / membership / flat allowance	EU "Roam Like at Home" abolished per-MB roaming surcharges, 15 June 2017.

Gyms. The health club is the purest field laboratory for flat-rate bias, and Section 5 returns to it repeatedly; the headline is that most monthly members would have paid less buying visits one at a time (DellaVigna and Malmendier, 2006).

Internet and mobile. When AOL replaced metered dial-up ($9.95 for five hours, then $2.95 an hour) with a flat $19.95-a-month unlimited plan on 1 December 1996, demand behaved exactly as the zero-marginal-price story predicts: usage roughly doubled, more than a million new subscribers arrived within weeks, and the network collapsed into busy signals, drawing state-attorney-general suits and a $24 million settlement. Two decades later the mobile industry re-ran the experiment in reverse and then forward: AT&T abolished unlimited smartphone data in 2010 because 3% of users generated 40% of traffic, and the carriers competed unlimited back into existence by 2017 — because customers hated the metered overage and the "bill shock" it produced more than the carriers hated the congestion.

Streaming and the abolition of the late fee. Netflix's decisive move was not mailing DVDs but abolishing the meter: by 2000 it had dropped per-title rental for a flat monthly "all-you-can-watch" subscription with no due dates and no late fees. Its rival Blockbuster collected roughly $800 million in late fees in 2000 — about 16% of revenue — and its belated 2005 abolition of them, forced by the flat-rate competitor, tore a nine-figure hole in its own income. (The oft-told origin story that Netflix was born of a $40 late fee for

Apollo 13 is, by the account of co-founder Marc Randolph, a "convenient fiction"; early Netflix itself charged per-rental fees. We report it as a myth about late-fee resentment, not as history.)

Tolls and the invisible meter. Tolls are the one domain where the effect is documented running the other way, and instructively so. When a highway authority switches from cash toll booths to electronic collection, the toll stops being salient — the driver no longer counts out money at a booth — and Finkelstein (2009) shows the predictable consequence: over time, tolls under electronic collection settle 20–40% higher than they would have under cash, and toll-setting becomes less sensitive to the electoral calendar. The meter, when it is made invisible, stops disciplining the price. This is the taxi-meter effect photographed in negative, and it is the empirical anchor for the salience mechanism.

Cloud and the return of the meter. The software industry has spent a decade moving in both directions at once. Adobe's 2013 shift from a perpetual license to the Creative Cloud subscription — a flat recurring fee — provoked a 50,000-signature petition and then, by FY2025, delivered roughly 96% of Adobe's revenue. Yet the same period saw enterprise software rediscover the meter, as consumption-based pricing (charging per compute-credit, per host, per gigabyte ingested) spread to perhaps three in five SaaS firms by 2023 — and rediscover, with it, the taxi-meter effect, now rebranded "bill shock" and treated as the fastest way to lose a customer's trust. The industry's response — live-usage dashboards, projected-charge views, spending alerts — is an attempt to make the meter tolerable, which is to say less salient at the moment it hurts.

5 Theories of Flat-Rate Bias and Meter Aversion

We now work through the five mechanism-families of Figure 2, each with its logic, its evidence, and its counterevidence. Table 3 summarizes them. The reader should hold in mind, throughout, that these are not competing hypotheses of which one must be true; they are overlapping forces, several of which operate at once in any given case, and the hard problem is not to find evidence for each — that is easy — but to apportion weight among them.

5.1 Rational and near-rational explanations

The first family denies that anything is wrong. Three strands.

Insurance and risk aversion. A flat rate converts a random bill into a certain one. A risk-averse consumer facing uncertain future usage will pay a premium for that certainty exactly as they pay a premium for any insurance, and the premium is not a mistake

but the price of a hedged position. Lambrecht and Skiera (2006) identify this *insurance effect* as one of the significant drivers of the flat-rate bias in their data, and it is the least controversial explanation on offer: a consumer who would pay $30 to avoid a bill that is equally likely to be $10 or $50 is behaving unimpeachably. Herweg and Mierendorff (2013) show that this intuition can be formalized so tightly that, under expectation-based reference dependence, the flat rate is not merely tolerated by such consumers but is the *profit-maximizing* tariff for the firm to offer them.

Option and flexibility value. Even a consumer who will *probably* use little may rationally pay for the *option* to use a lot without friction. Kridel et al. (1993) put an explicit option value on flat-rate telephone service and estimate it at around $9.49 per subscriber — a non-trivial fraction of the bill that is invisible to any accounting that looks only at realized minutes. The flat rate, on this view, is bought partly for the states of the world in which it is used heavily, which an ex-post comparison against realized usage necessarily ignores.

Convenience and transaction costs. Metering has costs of its own: the consumer must monitor usage, track a balance, and decide, each time, whether the next unit is worth its price. A flat rate abolishes all of that cognitive overhead. Lambrecht and Skiera (2006) label this the *convenience effect* — though, tellingly, it is the one cause among their four that did *not* reach significance in their data, a useful reminder that a plausible mechanism is not a confirmed one.

The rational family's deepest root is the theory of the **two-part tariff**. Oi (1971), in a paper framed as Disney's problem of whether to charge for the gate, the rides, or both, showed that a monopolist facing identical consumers should set the per-unit ("per-ride") price equal to marginal cost — the efficient level, inducing efficient consumption — and extract the entire consumer surplus through the lump-sum entry fee (Figure 3). The pure flat rate (marginal price zero) and the pure meter (no fixed fee) are the limiting cases of this design, and the whole apparatus of nonlinear pricing (Schmalensee, 1981; Maskin and Riley, 1984; Wilson, 1993) lives in between. The lesson for this report is that flat and near-flat structures can be efficient and profit-maximizing for entirely rational reasons, so the mere existence of a two-part or flat tariff is no evidence of consumer error.

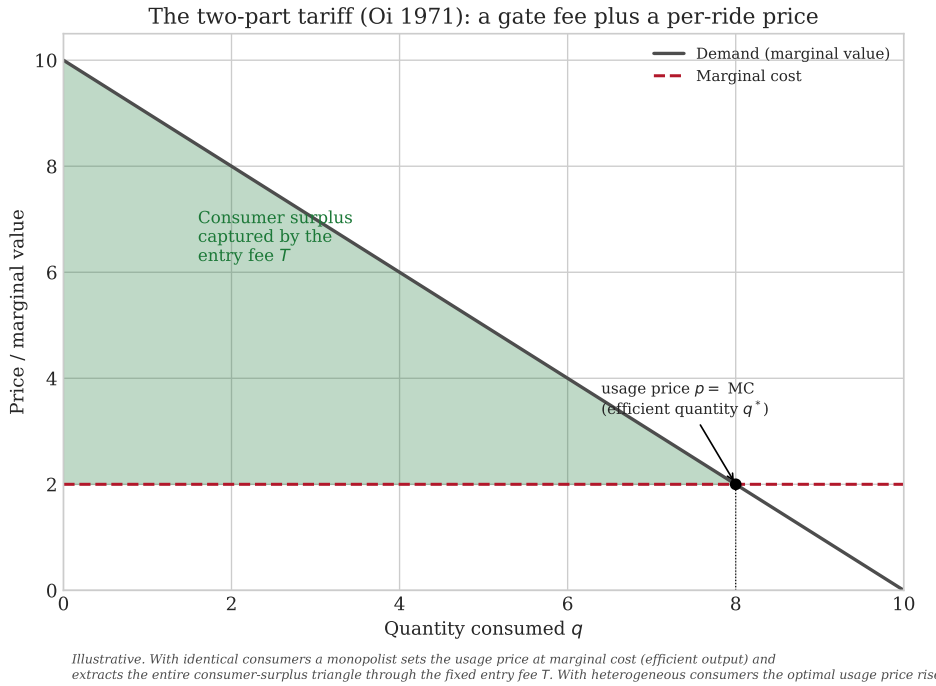

Figure 3: The two-part tariff (Oi, 1971). With identical consumers the monopolist sets the usage price at marginal cost (the efficient quantity q^*) and captures the whole consumer-surplus triangle through the fixed entry fee T. Pure flat and pure metered pricing are the limiting cases.

5.2 Biased beliefs about usage

The second family locates the error not in preferences but in *beliefs*: consumers choose flat rates because they mispredict how much, or how variably, they will consume.

Overestimation of the level of usage. The cleanest evidence is the gym. When DellaVigna and Malmendier (2006) surveyed prospective members about how often they would attend, the average forecast was 9.5 visits a month; actual attendance, measured by card swipe, was 4.2 — an overestimate of more than a factor of two. A consumer who believes they will attend nine times reasonably prefers the flat membership; the same consumer, who actually attends four times, overpays for it. Nunes (2000) models the cognitive process behind such usage estimates, and Lambrecht and Skiera (2006) confirm an *overestimation effect* as a significant driver of the flat-rate bias in their internet data.

Overconfidence about the variance of usage. Grubb (2009) adds a subtler twist: consumers may forecast their *average* usage well but be overconfident about its *variance* — too sure they know what next month holds. Such consumers systematically underestimate the chance of an unusually heavy month, and firms respond with three-part tariffs whose steep overage charges harvest exactly those mispredicted tails. Grubb and Osborne (2015), studying cellular bills, estimate that this overconfidence costs consumers about $76 a year, and — in a result of some importance for policy — that mandatory bill-shock

alerts, which help consumers when prices are held fixed (raising welfare by around $21 a year), can *lower* welfare by around $33 a year once firms re-optimize prices in response.

The biased-beliefs family is powerful because it explains not just the tariff choice but its persistence: overconfident consumers do not learn quickly, because they do not believe they were wrong. Its limitation is that consumers may nonetheless *learn*: Miravete (2003) finds that tariff mistakes are small and self-correct as consumers switch plans, and Goettler and Clay (2011) show that a flat-rate bias can emerge from fully rational Bayesian learning under switching costs, with no behavioral bias required at all — a standing reminder that the observed pattern is consistent with more than one account, a point pursued in Section 8.

5.3 The hedonic family: pain of paying, decoupling, and the zero-price effect

The third family is the heart of the taxi-meter story and the richest psychologically. Its premise is that paying *hurts* — not merely as foregone consumption but as an immediate, affective "pain of paying" (Zellermayer, 1996; Rick et al., 2008) — and that how much it hurts depends on how payment is arranged in the mind.

Coupling and decoupling. Prelec and Loewenstein (1998), in the foundational statement, model consumption and payment as linked by a psychological "coupling": each enjoyment carries a mental charge of the payment that funds it, and each payment is buffered, or not, by the pleasures it buys. Their double-entry mental accounting predicts that people prefer to have consumption and payment *decoupled* — to pay for a vacation before taking it, so the holiday is not shadowed by the meter, and to be paid for work after doing it. Thaler (1985, 1999) builds the same idea into a general theory of mental accounting in which flat fees, season tickets, and prepayment all decouple payment from use, dissolving the moment-to-moment association that a meter enforces. Metering is maximal coupling: it welds a payment to every unit of consumption, so the meter is felt precisely when enjoyment should be.

Payment depreciation and sunk cost. Once a flat fee is paid, it becomes a sunk cost, and sunk costs drive behavior even when they should not (Arkes and Blumer, 1985): the theatergoers in Arkes and Blumer's classic experiment, randomly charged full or discounted prices for identical season tickets, attended more plays the more they had paid. Gourville and Soman (1998) sharpen this into "payment depreciation": the behavioral grip of a payment fades with time, so a health-club member's attendance spikes just after a bill and decays until the next one. The flat fee thus does double work — it sets the marginal price to zero *and* plants a sunk cost that pushes later consumption up, the two effects that let an all-you-can-eat buffet fill its tables (prepaid diners eat to

"get their money's worth," independent of the zero marginal price; Just and Wansink, 2011, though the specific buffet estimates carry a research-integrity caveat noted below).[2]

The zero-price effect. Why is a marginal price of zero so much more attractive than a marginal price of a few cents? Shampanier et al. (2007) show that zero is not merely the bottom of the price scale but an affectively special point: when they dropped the price of a Hershey's Kiss from one cent to free — while cutting the price of a competing truffle by the same penny — demand for the free chocolate leapt from 27% to 69%, a swing no cost–benefit model can explain. A flat rate makes every marginal unit free in exactly this sense, so it does not just make consumption cheap; it makes it feel costless, which is hedonically privileged. This is the micro-mechanism under the taxi-meter effect: the meter's sin is to put a positive, salient price on the next unit, and the flat rate's gift is to make that price vanish.

Salience and the payment mechanism. How much any of this bites depends on how *noticeable* the payment is. Soman (2001) shows that more transparent payment forms — ones the consumer rehearses and feels — restrain spending more than opaque ones; Prelec and Simester (2001) find that merely being allowed to pay by credit card, which decouples and dulls the payment, can raise willingness to pay strikingly (in one auction for sold-out tickets, by up to 100%); Raghubir and Srivastava (2008) find analogous effects for gift cards and other "monopoly money." And Finkelstein (2009), already met in Section 4, supplies the field counterpart: automatic electronic tolling, by stripping the payment of salience, lets tolls drift 20–40% higher. The common thread is that the meter is bad not only because it charges per unit but because it charges *visibly and repeatedly*; hide the payment and the pain, and much of the mechanism goes with it.

5.4 Reference dependence and loss aversion

The fourth family formalizes why many small charges hurt more than one large one, using the value function of prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). That function is kinked at the reference point and steeper for losses than for gains (loss aversion, $\lambda \approx 2.25$) and concave in the domain of losses (diminishing sensitivity). Two consequences follow directly. First, each metered charge, evaluated against a reference point of not-paying, registers as a *loss*, and losses loom large. Second, because the loss function is concave, segregating a payment into many small losses is more painful than integrating it into one large loss of the same total — N charges of $\$c$ hurt more than a single charge of $\$Nc$ (Figure 4). The meter is the maximally segregated,

[2]The pizza-buffet field experiments of Just and Wansink are the most-cited buffet studies, but Brian Wansink's Cornell lab was found to have committed research misconduct (with numerous retractions), and a reanalysis found many statistical inconsistencies in those papers. We cite the *direction* of the effect, which is independently supported by Arkes and Blumer (1985) and the zero-price literature, not the specific estimates.

maximally loss-framed way to pay; the flat fee integrates the whole month into a single loss that the consumer adapts to and forgets. Herweg and Mierendorff (2013) build this into a formal industrial-organization model: with Kőszegi–Rabin expectation-based loss aversion, consumers strictly prefer the payment certainty of a flat rate, and offering it is optimal for the firm — a rare case in which a behavioral mechanism has been given a fully worked-out equilibrium treatment rather than left as a laboratory curiosity.

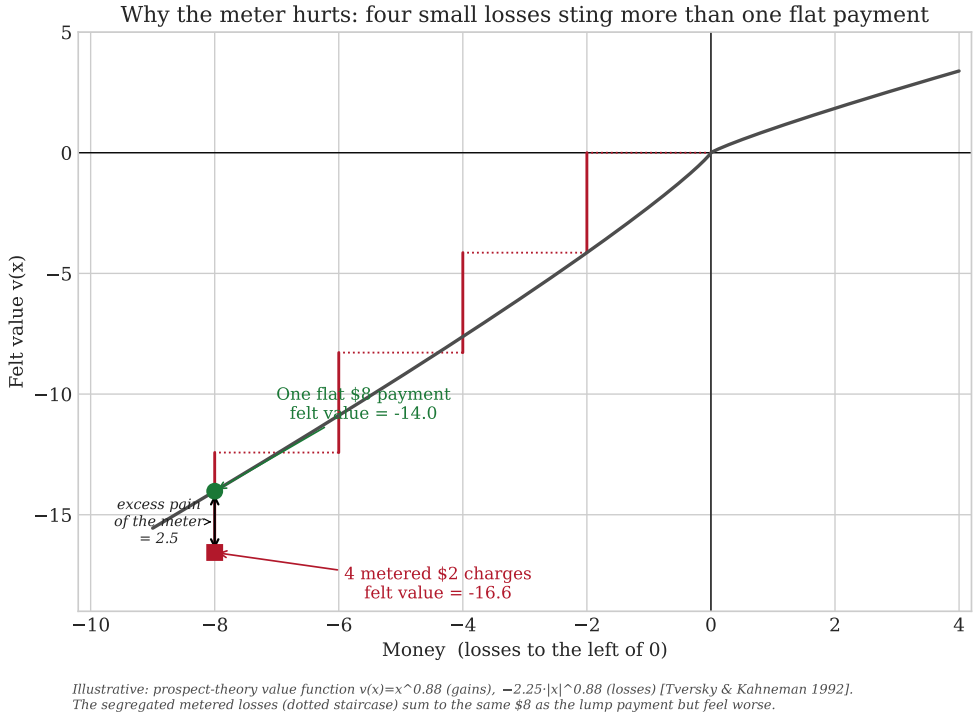

Figure 4: Why the meter hurts, in prospect-theory terms. Because the value function is loss-averse and concave over losses, four small metered charges (dotted staircase) that sum to the same $8 as a single flat payment produce a lower total felt value: the segregated losses sting more. The flat fee integrates the month into one loss the consumer adapts to.

5.5 Self-control and commitment

The fifth family turns on time-inconsistency. People discount the immediate future more sharply than the standard model allows — the quasi-hyperbolic, "β–δ" present bias of Laibson (1997) — and they are often *naïve* about it, wrongly believing their future selves will act as their present self wishes (O'Donoghue and Rabin, 1999). This cuts two ways in the flat-rate story, and the tension between them is instructive.

On one reading, a flat fee is a *commitment device*: a sophisticated present-biased person, knowing they will be tempted to skip the gym, deliberately pays a flat fee that sets the marginal price of a visit to zero, buying themselves the motivation to go. On this view the flat-rate "overpayment" is not a mistake but a purchase of self-control. DellaVigna

and Malmendier (2004) give the supply-side theory: firms optimally price *investment* goods (gyms, whose costs are immediate and benefits deferred) below marginal cost and back-load their fees, precisely to attract consumers who over-predict their future virtue.

But the gym data cut against the commitment reading for *most* consumers. DellaVigna and Malmendier (2006) note three facts a sophisticated committer would not produce: attendance declines over the membership rather than being sustained by it; monthly members, who pay *more* for the flexibility to cancel, survive *longer* than annual members (the opposite of a committer's choice); and members delay cancellation for 2.3 months after their last visit, paying $187 for a membership they have stopped using, where a sophisticated agent would cancel at once. Moreover, on the strict definition of Bryan et al. (2010), a flat plan counts as a commitment device only if the consumer would pay for the self-binding *as such*, with no other benefit — which mere convenience or overestimated usage does not satisfy. The weight of the evidence is therefore that the gym's flat-rate overpayment is, for most members, a genuine error rooted in naïve over-prediction of future use, with the deliberate-commitment reading applying only to a sophisticated minority.

The self-control family also has a darker corporate face. Bar-Gill (2012) argues that competition does not discipline firms into simple honest contracts but the reverse: it forces them to design contracts that exploit consumers' myopia and overoptimism, inflating perceived benefits with up-front lures and hiding true costs in back-loaded, contingent fees. The auto-renewing flat plan that a naïf under-cancels, the "free" handset financed by a long lock-in, the introductory rate that resets — these are, on Bar-Gill's account, the equilibrium products of a market serving imperfectly rational consumers, and they are the reason so many flat and three-part tariffs come wrapped in switching costs.

5.6 Synthesis: over-determination and the identification problem

The uncomfortable truth of Table 3 is that all five families are, to some degree, true, and that they make overlapping predictions. A consumer who chooses a flat gym membership may be insuring against a variable bill, over-predicting their attendance, avoiding the pain of a per-visit meter, integrating their losses, *and* trying to commit their future self — all at once. Because the mechanisms co-move, observing that flat-rate preference exists, or even measuring its size, does not tell us how to apportion it. Lambrecht and Skiera (2006) make the most serious attempt at decomposition, and their finding that three of four candidate causes (insurance, taxi-meter, overestimation) are separately significant while a fourth (convenience) is not, is valuable precisely because it shows the decomposition is possible in principle — but it is one dataset in one domain. Figure 5 offers a qualitative

Table 3: The five mechanism-families: prediction, evidence, and counterevidence

Family	**Core prediction**	**Key evidence**	**Counterevidence / limits**
Rational: insurance, option & convenience value	Flat rate bought to hedge bill variance and preserve frictionless use; not an error.	Insurance effect significant (Lambrecht and Skiera, 2006); option value ∼$9.49 (Kridel et al., 1993); flat optimal under risk aversion (Herweg and Mierendorff, 2013).	Cannot explain magnitudes as large as the gym's ∼$600, or attendance decline; the convenience effect was *not* significant in Lambrecht and Skiera (2006).
Biased beliefs (overestimation, overconfidence)	Consumers mispredict the level or variance of future usage and over-buy capacity.	Gym forecast 9.5 vs. actual 4.2 visits (DellaVigna and Malmendier, 2006); overestimation effect (Lambrecht and Skiera, 2006); variance overconfidence (Grubb, 2009); bill-shock cost ∼$76/yr (Grubb and Osborne, 2015).	Consumers learn and switch over time (Miravete, 2003); the pattern can even arise from rational learning under switching costs, no bias needed (Goettler and Clay, 2011).
Hedonic: pain of paying, decoupling, zero-price	Metering couples payment to consumption and puts a salient positive price on each unit; flat rates decouple and zero the marginal price.	Prospective-payment preference (Prelec and Loewenstein, 1998); payment depreciation (Gourville and Soman, 1998); zero-price 27%→69% (Shampanier et al., 2007); salience/tolls (Finkelstein, 2009).	Largely a hedonic *experience* effect; translating it into a quantified *choice* premium is hard and context-dependent.
Reference dependence / loss aversion	Each metered charge is a loss; many small losses hurt more than one integrated loss.	Value-function logic (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992); equilibrium model with flat rate optimal (Herweg and Mierendorff, 2013).	Reference points are hard to observe; predictions can flip if the meter, not not-paying, becomes the reference.
Self-control & commitment	Present-biased consumers buy flat plans to force future use — or naïvely under-cancel them, and firms design contracts to exploit this.	β–δ present bias (Laibson, 1997; O'Donoghue and Rabin, 1999); contract design (DellaVigna and Malmendier, 2004); exploitation (Bar-Gill, 2012).	For most gym members the data reject deliberate commitment (attendance declines; monthly > annual survival; $187 paid after last visit) (DellaVigna and Malmendier, 2006; Bryan et al., 2010).

map of which mechanisms plausibly dominate in which domains; it is a synthesis of the reviewed literature, not a meta-analytic estimate, and it is best read as a set of hypotheses about where each force is strongest.

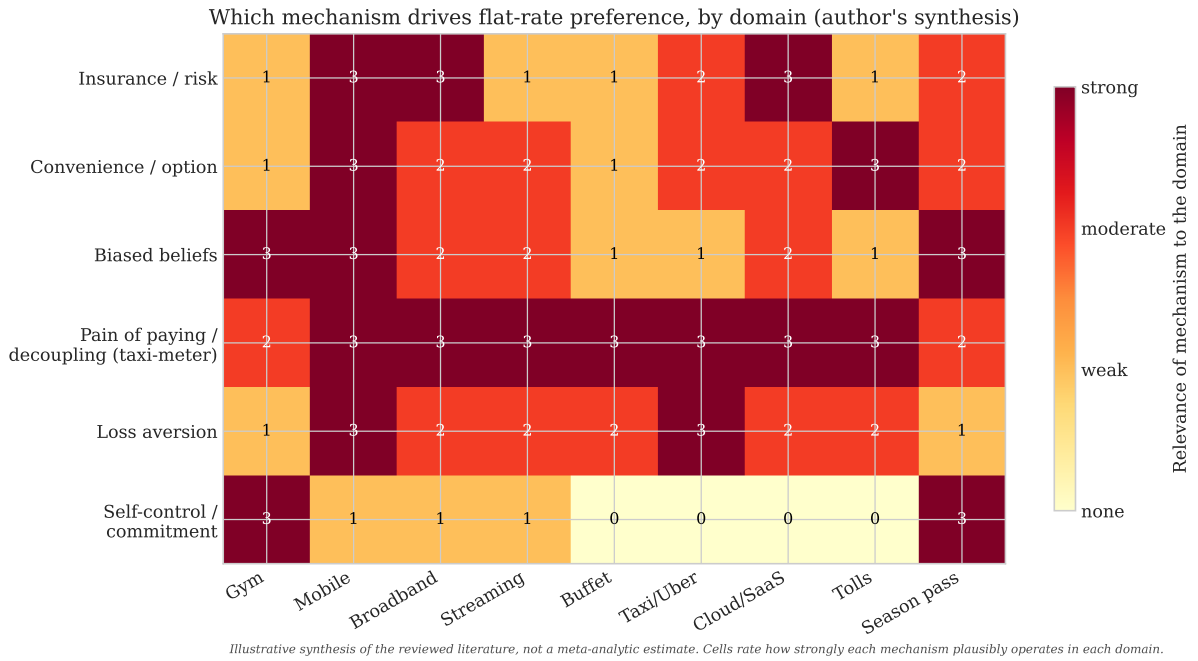

Figure 5: A qualitative map of which mechanism-family most plausibly drives flat-rate preference in each domain (author's synthesis of the reviewed literature, not a meta-analytic estimate). The pain-of-paying/taxi-meter row is the most broadly relevant; insurance dominates where bills are volatile (mobile, cloud); commitment matters chiefly for gyms and season passes.

6 Quantitative Illustrations

This section collects the quantitative anchors — the numbers that make the phenomenon concrete — and the historical arc along which the theory and practice developed.

6.1 The gym paradox in numbers

The single most-cited quantification of flat-rate bias is the health-club study by DellaVigna and Malmendier (2006): 7,752 members across three clubs over three years, whose numbers repay a close look (Figure 6). Members on the flat monthly contract (over $70 a month) attended 4.3 times a month, which works out to more than $17 per visit — yet a ten-visit pass priced each visit at $10. Only 20% of monthly members paid less per visit than the pass would have charged; the other 80% would have saved by paying per visit. The average monthly member forgave about $614 over a membership — 43% of the roughly $1,423 spent. And the mistake compounded at the exit: members let 2.3 months elapse between their last visit and cancellation, paying about $187 for a membership they

had already stopped using. The right panel shows the belief that drives it all: a forecast of 9.5 visits a month against an actual 4.2.

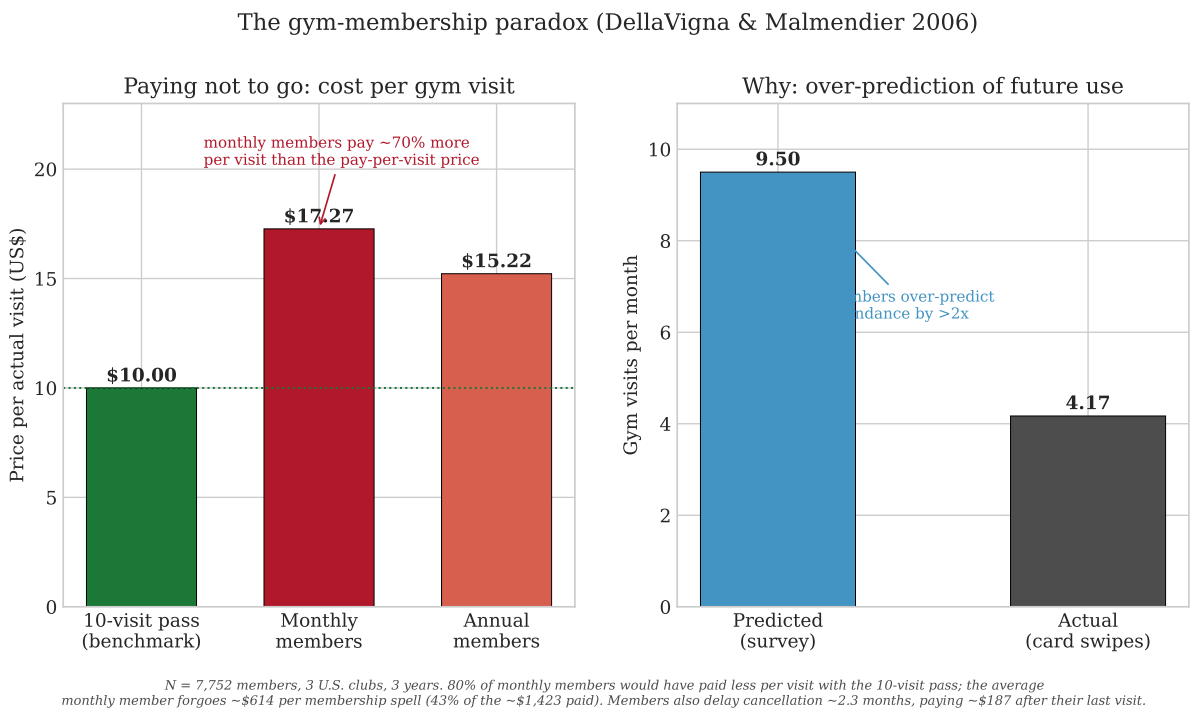

Figure 6: The gym-membership paradox (DellaVigna and Malmendier, 2006). *Left:* flat-fee members pay far more per actual visit than the pay-per-visit price. *Right:* they do so because they forecast more than twice the attendance they realize.

6.2 The flat-rate bias in the field

Lambrecht and Skiera (2006)'s internet-tariff data give the phenomenon's incidence. Depending on the strictness of the criterion, up to 46.6% of subscribers were flat-rate biased — paying for a flat rate when a metered plan would have been cheaper — against only about 5.8% who displayed the opposite, pay-per-use bias. More than half of the flat-rate-biased subscribers overpaid by 100% or more. And yet — the finding that gives the paper its title — flat-rate bias did *not* raise churn; if anything it stabilized the customer relationship, raising estimated customer lifetime value by 87% to 135%. The premium these consumers paid was not extracted from resentful captives; it was paid, apparently contentedly, for the peace of a predictable bill and an absent meter. Figure 7 shows the logic: consumers whose usage falls below the break-even point but who choose the flat rate anyway are the flat-rate-biased region.

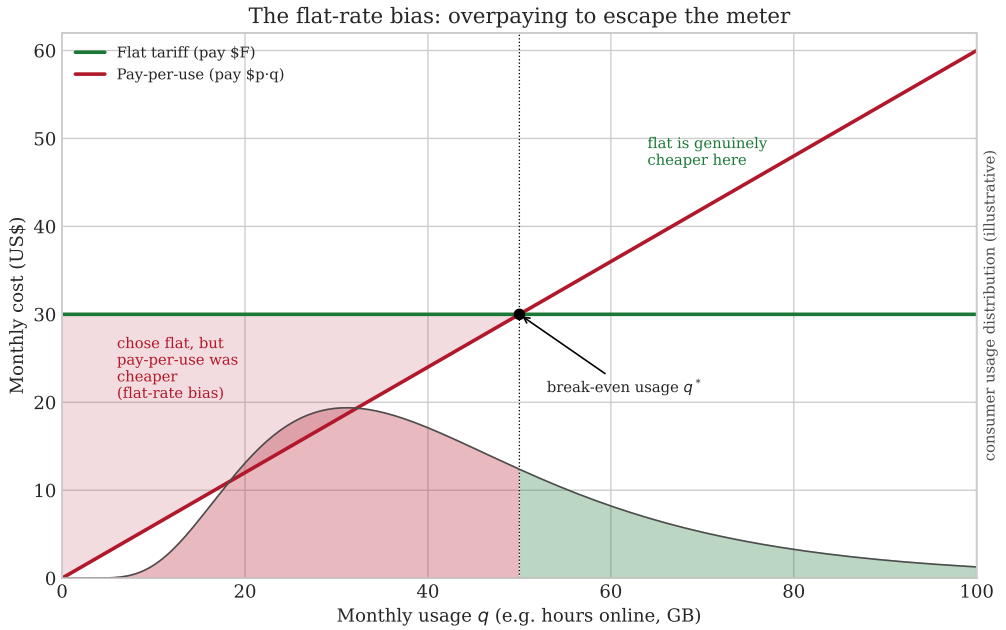

Figure 7: The flat-rate bias, schematically. Consumers with usage below the break-even point q^* who nonetheless choose the flat tariff overpay (shaded wedge). Lambrecht and Skiera (2006) find up to 46.6% of subscribers in this region, over half of them overpaying by 100% or more — yet without elevated churn.

6.3 A century of the meter and the membership

The tension between metered and flat pricing is not new, and its theory and practice have advanced in a rough dialogue (Figure 8). The theory runs from Oi (1971)'s two-part tariff through Thaler (1985)'s mental accounting, Prelec and Loewenstein (1998)'s pain of paying, the flat-rate-bias and gym papers of 2006, and Finkelstein (2009)'s salience result to the loss-aversion models of the 2010s. The practice runs from Disneyland's abandonment of ride coupons for flat admission (1982), through AOL's fateful flat rate (1996), Netflix's abolition of the late fee (2000), Adobe's move to subscription (2013), and Uber's replacement of the visible meter with an upfront quote (2016), to the policy interventions — the EU's abolition of roaming surcharges (2017) and New York's congestion charge (2025) — that now regulate the meter directly.

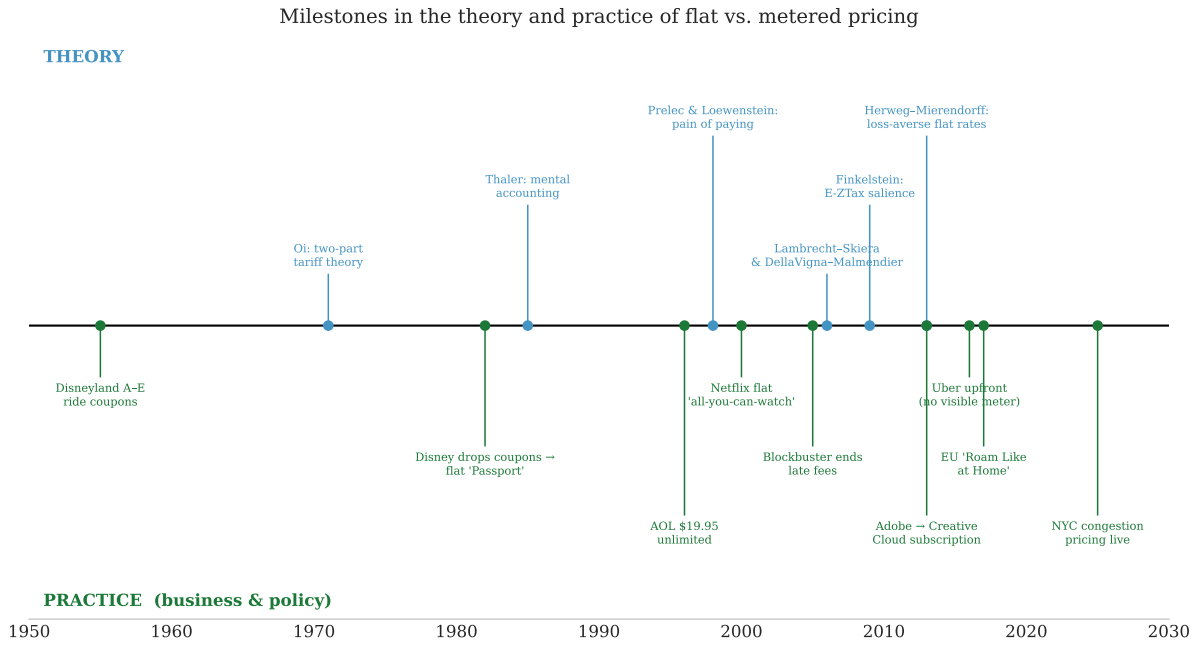

Figure 8: Milestones in the theory (above) and practice (below) of flat versus metered pricing. The two tracks advance in dialogue: business experiments like AOL's 1996 flat rate and academic results like the 2006 flat-rate-bias and gym papers inform each other.

7 Implications

7.1 For individual consumers

The consumer lesson is not the naïve one that flat rates are traps to be avoided. It is that a flat rate bundles a real service — insurance against a variable bill, freedom from the meter, the option to use freely — with a real risk — overpaying because you over-predicted your use and then failed to cancel. Three practical rules follow. First, *estimate usage from your past, not your aspirations*: the gym member who budgets from the workouts they will actually do, not the ones they intend, chooses better (DellaVigna and Malmendier, 2006). Second, *price the intangibles honestly*: if the predictable bill and the absent meter are worth the premium to you — and for many people they genuinely are — then paying it is not a mistake, and the contentment of the flat-rate subscribers in Lambrecht and Skiera (2006) should be taken at face value. Third, *beware the exit, not just the entry*: auto-renewal and cancellation inertia turn a one-time misjudgment into a recurring one, and the $187 the average lapsed gym member paid after their last visit is the price of not attending to the back end of the contract.

7.2 For firms

For sellers, the literature is close to a manual. A flat rate is an instrument for raising both willingness to pay and retention: it lets the firm charge the risk-averse for certainty and the optimistic for capacity they will not use, and it does so *without* the churn cost one might expect: flat-rate-biased customers do not leave, whereas it is the *pay-per-use*-biased customers — those stung by their metered bills — who churn, at multiples of the base rate (Lambrecht and Skiera, 2006). Bundling many goods into one price is profitable for a deeper reason: aggregating independent valuations shrinks their dispersion by a law-of-large-numbers effect, letting a single flat price capture more surplus than item-by-item pricing could — the formal case for the "all-you-can-eat" bundle (Bakos and Brynjolfsson, 1999; Adams and Yellen, 1976). When usage-based pricing is nonetheless the right choice — because value scales with use, or because a few heavy users would bankrupt a flat plan, as they nearly did AOL — the firm's task becomes managing the taxi-meter effect: softening the meter's salience with alerts, dashboards, and projected-charge views so that the "bill shock" that drives churn is anticipated rather than suffered. Two caveats temper the manual. The efficiency of these designs shades into exploitation when they are built to harvest consumer mistakes rather than serve preferences (Bar-Gill, 2012), and flat rates invite adverse selection, drawing the heavy users who cost the most — so the flat-rate seller must either cross-subsidize across a broad pool (the buffet's logic) or cap the tail.

7.3 For regulators

Policy has, in practice, targeted the meter's worst edge: the surprise. The bill-shock that a three-part tariff's overage produces was the object of the US wireless industry's 2011 agreement, brokered with the FCC, to send free usage alerts (now covering the large majority of subscribers), and of the European Union's more drastic abolition of retail roaming surcharges under "Roam Like at Home" in 2017. The academic caution here is real and comes from Grubb and Osborne (2015): alerts that plainly help consumers when prices are fixed can be partly undone — even reversed in welfare terms — when firms re-price in response, so mandated transparency is not a free lunch. A second regulatory front concerns salience in the other direction. Drip pricing and "junk fees," where a headline price is quoted and the true total assembled only at checkout, exploit the same salience machinery in reverse, and field evidence that drip pricing raises spending by around 21% (Blake et al., 2021) has driven recent FTC rulemaking on "junk fees" (finalized 2024, effective 2025). And Finkelstein (2009)'s tolls are the standing warning that reducing a payment's salience is a double-edged tool: the same automatic, decoupled payment that spares a consumer the pain of the meter also spares the price the discipline of being noticed, and lets it rise.

8 Discussion

The pay-per-use mirror. Flat-rate bias is the more famous half of a symmetric phenomenon. Lambrecht and Skiera (2006) document its mirror — consumers who choose metered plans when a flat rate would have been cheaper — and though it is rarer in their data (about 5.8% versus up to 46.6%), its existence matters for the theory, because it shows the direction of "bias" is not fixed. Whether a given person over-buys the flat rate or the meter depends on the interplay of their beliefs, their risk attitude, and the framing they face. This is the strongest reason to doubt that "people prefer flat rates" is a law; what people prefer is more subtle and more manipulable than that.

When the meter is the point. There are settings in which the pain of the meter is not a bug to be abolished but a feature to be harnessed. A person trying to smoke less, spend less, or drive less may *want* the salient, coupled, per-unit charge that makes each cigarette, purchase, or mile hurt a little — the pain of paying working as a brake rather than a drag. Indeed Wertenbroch (1998) shows that consumers deliberately ration their own consumption of "vice" goods by buying them in small, effectively more-expensive-per-unit quantities — paying more per unit on purpose, in order to consume less. Metered pricing can also serve budgeting and fairness, letting light users avoid subsidizing heavy ones (the objection low-usage households raise to flat water and energy charges). The normative valence of the meter, in other words, depends on whether the consumption it prices is something the consumer wants more of or less of. The taxi-meter effect makes flat rates feel good partly by encouraging consumption; where consumption should be discouraged, that is exactly the wrong medicine.

The identification problem, again. The deepest open question is not whether any mechanism operates but how to weigh them, and it is genuinely hard because the mechanisms co-vary and much of the action is hedonic and hard to observe. Progress will come from designs that move one mechanism while holding the others fixed — varying the salience of an identical charge, or the timing of an identical payment, or the framing of an identical reference point — rather than from more demonstrations that flat-rate preference exists. The field has the theory; what it lacks is clean apportionment.

The algorithmic future. Two opposing forces will shape the meter's future. On one side, metering has never been cheaper or finer: software can bill per second, per token, per API call, and increasingly per personalized real-time price, and the cloud and ride-hail industries show how quickly fine-grained metering spreads once it is technically free. On the other side, the very firms with the best metering technology keep retreating to flat subscriptions and upfront quotes — Netflix, Adobe, Uber's fixed fare — precisely

because they have learned what this literature predicts: that customers hate the meter, and that the money is in selling its absence. Artificial intelligence sharpens both edges. It makes possible a world of perfectly personalized, continuously metered prices that would maximize extraction from each of the five mechanisms at once — and it gives firms every incentive to hide that machinery behind a flat, friendly, meter-free facade. Which face the technology shows the consumer will be, as it has always been, a choice about salience.

9 Conclusion

The dislike of the meter is one of the best-documented and least-understood facts about how people pay. Best-documented, because it turns up wherever one looks — in the tariff choices of internet subscribers, the attendance records of gym members, the demand curves of buffets and free chocolate, and the pricing histories of theme parks, telephones, video rental, software, tolls, and taxis — and because its magnitudes are large: half of some populations overpay, often by 100% or more, and do so happily. Least-understood, because the phenomenon is over-determined, produced by at least five mechanisms — rational insurance, biased beliefs, the hedonic pain of the coupled meter, loss aversion, and naïve self-control — that predict the same behavior and resist separation. What unifies them is not the flat-versus-metered contrast itself, which the mirror-image pay-per-use bias shows is not decisive, but the deeper variable of which it is one expression: the salience and coupling of payment. The meter is disliked because it makes paying visible, repeated, and welded to the moment of pleasure; the membership is loved because it makes paying invisible, singular, and banished from the moment of use. That is why a consumer will pay to be rid of the meter, why a firm will pay to sell its absence, and why, in an age when everything can be metered to the second, so much of the market's ingenuity is spent making sure that nothing feels like it is.

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