

Change How the Price Is Set and Honesty Becomes the Best Move

— Under second-price rules, bidding **90**, **100**, **110** or **140** all return **20.0000** — under first-price rules, the honest **100** returns exactly **0** while **90** returns **10.0000** — what changed is the rule, not the person — [Paper 436]

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— *From thinking to syncing.* —

Abstract

Whether one speaks honestly is taken to be a matter of character. This paper shows that it can be settled by the rule instead—change one thing about how the price is set and honesty becomes optimal. No new theorem or law is claimed. First, this is the core of the paper. Under second-price rules, bidding **90**, **100**, **110** or **140** all return the same **20.0000** (Section 2). Second, that return equals the gap between the valuation and the highest rival bid, **20.0000**, and inversion returns the same value (Section 2). Third, bidding below the valuation loses the item and returns exactly **0**. That is the other side of the boundary (Section 2). Fourth, when the highest rival bid exceeds the valuation, overbidding returns **−20.0**, and honesty prevents that loss (Section 3). Fifth, under first-price rules the honest bid returns exactly **0**, while shading to **90** returns **10.0000** (Section 4). Sixth, the separator is whether one's own bid sets the price paid (Section 4). **Keywords:** second-price auction, Vickrey auction, strategy-proofness, mechanism design, revenue equivalence theorem.

Scope of this paper (scope note): No new theorem or law is claimed—second-price auctions, strategy-proofness and revenue equivalence are all standard (since 1961). No theorem is proved—the general proof that honesty is a dominant strategy is not given; numbers are put into one setting. No mechanism is recommended—which format ought to be used is not the subject. Collusion is not treated—rings among bidders and shill bids by the seller are not treated, and the conclusion changes if they are present. Common values are not treated—only the case of independently drawn private valuations. Where value is learned after winning, a separate argument is needed. Revenue is not compared—which format yields the seller more is not the subject. Relation to earlier papers: Paper 435 showed that constancy at every term does not settle the total—there a rule did not settle the whole; here a rule settles what is best for each. Paper 300 showed that common root and distinct root can be decided—“honest because honest by nature” and “honest because honesty pays” are distinct roots by that criterion. Paper 422 showed that the condition named as a rule’s core does not move the result—there what should have acted did not; here an operation that seems inert acts. Paper 423 showed that a right table still loses—there too a detail of the rule inverted the outcome. What is added is tabulating both formats at five bids, confirming by inversion that the honest return equals the gap, placing the underbid at exactly 0 as the other side of the boundary, giving a separate setting where overbidding turns negative, giving the gain from shading under first-price rules, and placing the separator at “does the bid set the price”.

1. Notation and the Question

Setting: Let v be one’s own valuation, b one’s bid, and m the highest rival bid. Under second-price rules the highest bidder wins and pays the second-highest bid.

$$\text{payoff} = \begin{cases} v - m & (b > m) \\ 0 & (b < m) \end{cases}$$

Under first-price rules the winner pays their own bid.

$$\text{payoff} = \begin{cases} v - b & (b > m) \\ 0 & (b < m) \end{cases}$$

Below, $v = 100$.

Observation 1.1

In bidding it is supposed better not to say what a thing is worth. Bid high and one wins but overpays—bid low and one saves but loses the item.

Observation 1.2

So everyone works out how far to shade. Reading the others—and the guessing game begins.

Question: Is that guessing game forced by the rule.

2. Under Second-Price Rules, Honesty Is Optimal

Computation 2.1: With $v = 100$ and $m = 80$, take the payoff at five bids.

Bid	Second-price payoff	First-price payoff
60	0.0000	0.0000
90	20.0000	10.0000
100	20.0000	0.0000
110	20.0000	−10.0000
140	20.0000	−40.0000

Observation 2.2

The second-price column is **20.0000** wherever the item is won. At 90 as at 140—because the price paid does not depend on one's own bid.

Observation 2.3

That value equals $v - m = 100 - 80 = \mathbf{20.0000}$. Inversion returns the same—one's own bid decides only whether one wins.

Observation 2.4

Bidding below the valuation loses the item. At 60 the payoff is exactly 0—the other side of the boundary, forfeiting the whole 20 that was available.

Observation 2.5

So the honest 100 is among the best moves. Ties are possible; falling short is not—no amount of reading the others improves on it.

3. Where Overbidding Turns Into a Loss

Computation 3.1: Place a setting where the highest rival bid exceeds the valuation: $m = 120$.

Bid	Wins?	Payoff
100 (honest)	no	0.0
140 (over)	yes	−20.0

Observation 3.2

Overbidding gives a negative payoff. −20.0—equal to $v - m = 100 - 120$.

Observation 3.3

Honesty avoids that loss. Not winning, the payoff is exactly 0—this is not losing the item but declining to take it.

Observation 3.4

So honesty guards on both sides. Shade down and one forfeits; bid up and one loses—squeezed from both, the valuation remains.

Observation 3.5

And this holds without knowing what the others will do. Whatever m is, $b = v$ is never the worst—so the guessing game is unnecessary.

4. The Separator

The separator: does one's own bid set the price paid.

Observation 4.1

Under first-price rules the bid sets the price. Say a high number and pay it—which creates the incentive to shade.

Computation 4.2: Under first-price rules, compare the honest 100 with a shaded 90.

The honest 100 returns exactly **0**; shading to 90 returns **10.0000**.

Observation 4.3

Under first-price rules honesty is not optimal. Shading is plainly better—though shading too far forfeits the item, and 60 returns to 0.

Observation 4.4

Under second-price rules the bid does not set the price. One pays the others' number—so the incentive to shade disappears.

Observation 4.5

These are distinct roots by the criterion of Paper 300. Both are called “he spoke honestly”—one a property of the person, one a consequence of the rule.

Observation 4.6

To be honest—collusion changes the conclusion. Rings among bidders, or shill bids by the seller—neither is treated here; only independently drawn private valuations.

Observation 4.7

One last thing—if honesty is wanted, make honesty pay. Rather than changing people, change one thing about how the price is set—what changed is the rule, not the person.

5. Roll Call and Closing

1. Second-price gives **20.0000** from **90 to 140** (Computation 2.1): **the core**.
2. That equals $v - m = 20.0000$ (Observation 2.3): **by inversion**.
3. At **60** the payoff is exactly **0** (Observation 2.4): **the other side**.
4. The whole **20** is forfeited (Observation 2.4): **the price of shading**.
5. At $m = 120$, overbidding gives **-20.0** (Computation 3.1): **equal to $v - m$** .
6. Honesty avoids that loss (Observation 3.3): **exactly 0**.
7. It holds without knowing the others (Observation 3.5): **no guessing needed**.
8. First-price honesty returns **0** (Computation 4.2): **not optimal**.
9. Shading to **90** returns **10.0000** (Computation 4.2): **the incentive**.
10. The separator is whether the bid sets the price (Observation 4.5): **distinct roots by Paper 300**.

Closing: In bidding it is supposed better not to say what a thing is worth—bid high and one overpays, bid low and one loses the item—so everyone works out how far to shade and the guessing game begins. But that game is not forced by the rule. Under second-price rules, honesty is optimal—with a valuation of 100 and a highest rival bid of 80, bidding 90, 100, 110 or 140 all return the same **20.0000**. The price paid does not depend on one's own bid, and the return equals $v - m = 100 - 80 = 20.0000$ —one's own bid decides only whether one wins. Shading to 60 forfeits the item and returns exactly **0**, giving up the whole **20** that was available. And bidding too high loses as well—where the highest rival bid is 120, bidding 140 returns **-20.0**, equal to $v - m$. Honesty does not win there, returns exactly **0**, and avoids the loss. Shade down and one forfeits, bid up and one loses, so squeezed from both sides the valuation remains. And this holds without knowing what the others will do, so the guessing game is unnecessary. One thing separates them—does one's own bid set the price paid. Under first-price rules it does, creating the incentive to

shade: the honest 100 returns exactly 0 while 90 returns 10.0000, though shading too far forfeits and 60 returns to 0. Under second-price rules one pays the others' number, and the incentive disappears. They are distinct roots by the criterion of Paper 300: both are called “he spoke honestly”, but one is a property of the person and one a consequence of the rule. To be honest—collusion changes the conclusion. Rings among bidders and shill bids by the seller are not treated; only independently drawn private valuations are. One last thing—if honesty is wanted, make honesty pay. Rather than changing people, change one thing about how the price is set. What changed is the rule, not the person.

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