PRINCIPLES OF MICROECONOMICS

What Does It Cost?

Marginal Analysis, Production, Costs, and Specialization

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Can you be worse at making everything and still have something to sell?

HOW TO READ THE CHARTS

- **Marginal cost**: what one more unit gives up
- **Marginal worth**: what one more unit is worth to the person who uses it
- **Gain**: what a choice or a trade adds
- Averages, totals, and anything else: ink

Which Line Gets the Next Hour?

	Dollars this hour adds	
Hour	Line A	Line B
1	20	15
2	18	14.5
3	16	14
4	14	13.5
5	12	13
6	10	12.5
7	8	12

Shaded: the hours in use.

Split ten whole machine-hours between independent lines A and B. Each added hour returns less than the previous one.

Now five hours go to each line, for a total return of 150.

Should the producer move an hour? If so, which way?

Each Hour Goes Where It Returns More

	Dollars this hour adds	
Hour	Line A	Line B
1	**20**	**15**
2	**18**	**14.5**
3	**16**	**14**
4	**14**	**13.5**
5	12	**13**
6	10	**12.5**
7	8	12

Shaded: the hours in use.
Hours 8–10 add: A 6, 4, 2; B 11.5, 11, 10.5.

The best ten hours are A's first four and B's first six. Moving A's fifth hour (12) to B's sixth (12.5) adds 0.5; moving another loses.

Put each hour where its next return is highest.

Split of the ten hours	Total return
All ten to A	110
All ten to B	127.5
Five and five	150
Four to A, six to B	**150.5**

A Cake Costs Adam the Y He Gives Up

Adam lives on his own and bakes cakes for himself. Everything else he could make, counted in dollars, we call Y: a cost of 0.90 means 90 cents' worth of other goods he no longer makes. With no cakes he makes 13.50 of other goods; each cake takes some away, and the amount taken is its cost.

Cakes	Total cost	**Marginal cost**	Average cost	Other goods
0	–	–	–	13.50
1	0.90	**0.90**	0.90	12.60
2	1.90	**1.00**	0.95	11.60
3	3.00	**1.10**	1.00	10.50
4	4.20	**1.20**	1.05	9.30
5	**?**	**1.30**	**?**	**?**

Marginal cost: the extra cost of one more cake.

Average cost: total cost divided by the number of cakes.

Adam bakes the fifth cake. What is his new average cost?

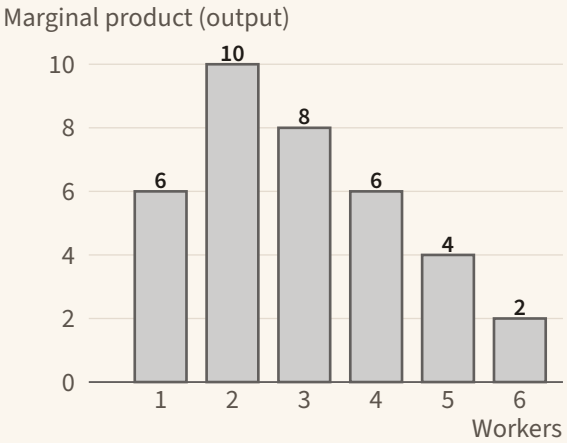
Marginal Cost Pulls Average Cost Up Behind It

The fifth cake costs 1.30, above the average of 1.05, so the average rises to 1.10 (5.50 ÷ 5): not to 1.30, and not to the midpoint, 1.175. A marginal above the average raises it; below, it lowers it.

Cakes	Total cost	Marginal cost	Average cost	Other goods
0	–	–	–	13.50
1	0.90	0.90	0.90	12.60
2	1.90	1.00	0.95	11.60
3	3.00	1.10	1.00	10.50
4	4.20	1.20	1.05	9.30
5	**5.50**	1.30	**1.10**	**8.00**

The marginal costs add up to the total: 0.90 + 1.00 + 1.10 + 1.20 + 1.30 = 5.50.

Why Marginal Cost Rises



Cost per added unit (12 ÷ extra output):

2.00 1.20 1.50 2.00 3.00 6.00

Add workers to a fixed kitchen. Each costs 12 Y. **Marginal product** is the extra output from one more worker.

The fifth worker adds 4 units:

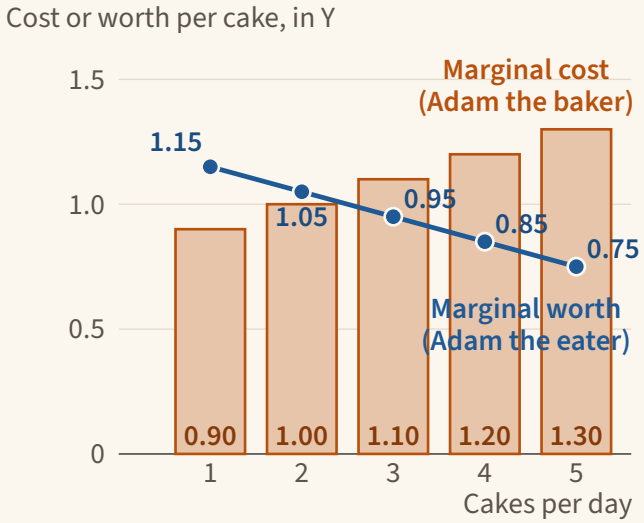
12 ÷ 4 = 3 Y per added unit.

The sixth adds only 2:

12 ÷ 2 = 6 Y per added unit.

Diminishing marginal returns: extra workers eventually add less, so each added unit costs more. Adam's cakes follow the same rule.

How Many Cakes Does Adam Bake?



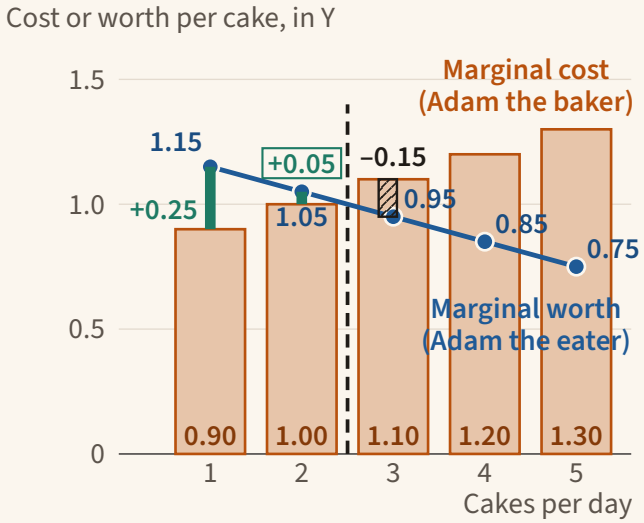
Adam is on his own, with no one to buy from or sell to. He is both the baker and the eater.

Bars: what each cake costs him to bake (**marginal cost**).

Dots: what each cake is worth to him as the eater (**marginal worth**), the most Y he would give up for it.

How many cakes does he bake?

Adam Stops at Two Cakes



Cake 1 is worth **1.15** and costs **0.90**: a gain of 0.25. Cake 2: worth **1.05**, cost **1.00**: a gain of 0.05. Cake 3 costs **1.10** but is worth only **0.95**: a loss. Adam stops at two.

Baker Makes the Early Cakes More Cheaply

WHO CAN MAKE MORE IN A DAY?

	Only cakes	Only other goods (Y)
Adam	**10**	**13.50**
Baker	8	8.80

Adam makes more of both goods: the *absolute advantage* in both.

WHO GIVES UP LESS FOR THE NEXT CAKE? (IN Y)

Cake	1	2	3	4	5	6
Adam gives up	0.90	1.00	1.10	1.20	1.30	1.40
Baker gives up	0.40	0.60	0.80	1.00	1.20	1.40

Baker gives up less for cakes 1 to 5 (shaded): the *comparative advantage* in early cakes. He is much worse at other goods, so a cake takes little from him.

Can Baker's Third Cake Suit Both Men?

Left alone, each man stops at two cakes. Could a third cake suit both?

ADAM ALONE

Cake	Worth	Cost
1	1.15	0.90
2	1.05	1.00
3	0.95	1.10

The third cake is worth less than it costs, so he skips it.

BAKER ALONE

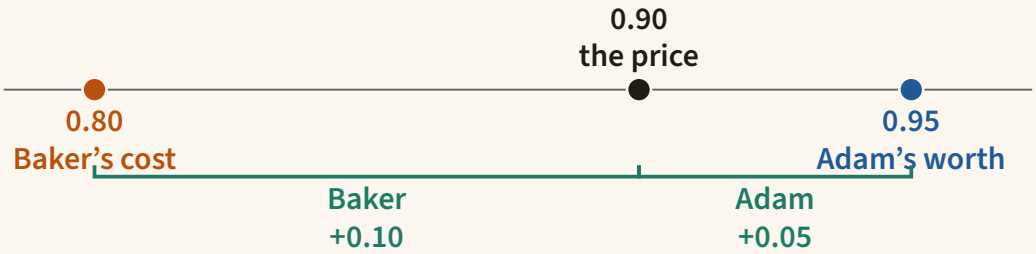
Cake	Worth	Cost
1	0.90	0.40
2	0.80	0.60
3	0.70	0.80

The third cake is worth less than it costs, so he skips it.

Baker bakes the third cake and sells it to Adam.
At which price do both men end up better off?

At 0.90, Baker Gains 0.10 and Adam Gains 0.05

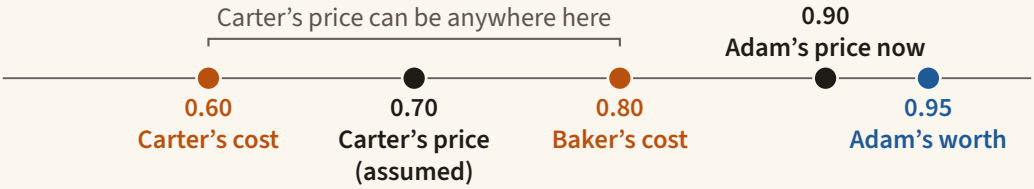
Say they settle at 0.90. Baker bakes three cakes and sells one to Adam. Baker still eats two; Adam now eats three. Alone they ate four cakes; now they enjoy five.



Together they gain 0.15 (0.95 – 0.80); the price only decides the split. Baker is worse at making everything, yet he has something to sell.

Carter Can Make the Third Cake for 0.60

A third producer, Carter, can bake the third cake for **0.60**; Baker's costs **0.80**. Suppose Carter offers it to Adam for 0.70 instead of Baker's 0.90. A cake is a cake, and Adam can switch at little cost.



Adam buys the third cake from Carter.
Who gains and who loses?

Adam and Carter Gain; Baker Loses

Gain from this one sale	Before (price 0.90)	After (price 0.70)
Adam (0.95 – price)	0.05	**0.25**
Carter (price – 0.60)	–	**0.10**
Baker (price – 0.80)	0.10	0
Total	**0.15**	**0.35**

The total gain rises by 0.20, which is what the economy saves: Baker's third cake uses up **0.80** of other goods, Carter's **0.60**. Of Adam's extra 0.20, 0.10 is a transfer from Baker, who loses his 0.10 gain. We assume away the cost of moving Baker's resources to other work. The loss is still real for the people who bear it.

Blocking Carter Protects Baker and Costs Adam

Suppose Baker persuades the authorities to bar Carter. The price returns to 0.90 and the total gain falls from 0.35 to 0.15; unless the rule buys safety or quality information, that 0.20 is a net loss.

Carter may enter: 0.35
(Adam 0.25 + Carter 0.10)



Carter barred, price back at 0.90: 0.15
(Adam 0.05 + Baker 0.10)



0.20 lost

HOW LICENSING CAN WORK

Suppose a state lets you sell hair-braiding services only after hundreds of hours of licensed training, and grants a license only when existing salons are judged inadequate.

Group	How many	Stake each
Incumbents	few	large
Buyers	many	small

Adam stands for many buyers, each losing a little. Organizing is easier for the few; it does not guarantee they win.

BEFORE YOU GO

Tell me what worked and what didn’t.

One minute, anonymous.

