"Rational Addiction"

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> Becker + Murphy
> JPE 1988

<u>addiction</u> — "a person is potentially addicted to c if an increase in his current consumption of c increases his future consumption of c." (Becker + Murphy, p. 681)

Note the words "potentially addicted"

⇒ Becker + Murphy show that it is necessary for past consumption of an addictive good to raise the marginal utility of present consumption (otherwise the good would not be addictive).

⇒ But past consumption does not on its own cause addiction. For addiction to occur, "adjacent complementarity" must also hold. Past consumption must raise the marginal utility of present consumption by more than the "full price" — i.e. the market price plus the present value of consumption's future costs (or benefits).

⟹ Note however that addiction can be either harmful or beneficial

HARMFUL ADDICTION
- Addiction to marijuana may have a negative impact on the addict's wage income.

BENEFICIAL ADDICTION
- Addiction to anabolic steroids may help Alex Rodriguez sign a 10-year, $275 million contract with the Yankees

⟹ addictions can also be harmful or beneficial to the individual's utility level

- tolerance — addiction is harmful if past consumption has reduced current utility level

    (see: Opiate dependence, symptoms of withdrawal)

- reinforcement — increase in past use raises the marginal utility of current consumption
    ⟹ could describe drugs
    ⟹ could describe physical exercise

→ "myopic addict" does not consider the future consequences of their behavior

→ "rational addict" does consider future consequences but he/she consumes the harmful addictive good anyway if:

POSITIVE EFFECT	NEGATIVE EFFECT
of increase in "addiction capital" on marginal utility of current consumption of addictive good	of higher "addiction capital" on the future harm from greater current consumption

>

↳ having had it in the past makes it more enjoyable today

future harms:
- "withdrawal", "hangover"
- lost wages

The Role of Three Parameters:
- rate of time preference
- rate of depreciation
- "cross partial"

and the Stability of Steady State

<u>role of time preference</u>

→ "present-oriented individuals are potentially more addicted than future oriented individuals" because "an increase in past consumption leads to a smaller rise in full price when the future is more heavily discounted." (Becker & Murphy, p 682)

→ degree of <u>adjacent</u> <u>complementarity</u> is higher when rate of time preference is higher

{
- past consumption is <u>**MORE LIKELY**</u> to raise the marginal utility of present consumption

  BY MORE THAN

- the "full price" (i.e. market price of the good plus the present value of the future costs (or benefits) of consuming it.)

  WHEN

- the future is more heavily discounted
}

rate of time preference's effect on degree of adjacent complementarity

role of depreciation

→ in this model, the mental and physical effects of past consumption can depreciate exogenously ("sleeping it off") or endogenously ("taking a hangover medication")

→ focus here on exogenous depreciation

"How long does the buzz last?"

- If the "buzz" does not last long the rate of depreciation is high

- if the buzz lasts long, then the rate of depreciation is low

Strictly speaking however we're examining depreciation of the stock of the addictive good

→ degree of adjacent complementarity is higher when rate of depreciation is higher

○ past consumption is MORE LIKELY
to raise the marginal utility
of present consumption

BY MORE THAN

○ the full price (i.e. market price plus
present value of future costs)

WHEN

○ stock of addictive good
depreciates faster

role of "cross-partial"

○ "cross partial" is the effect of an
increase in past consumption on
the marginal utility of present
consumption

○ by Young's Theorem it is ALSO the effect
of an increase in present consumption
on the marginal utility of past
consumption

○ "cross partial" represents the interplay
of past + present consumption on utility

- assuming that the "cross partial" is positive (i.e. an increase in past consumption raises the marginal utility of present consumption)

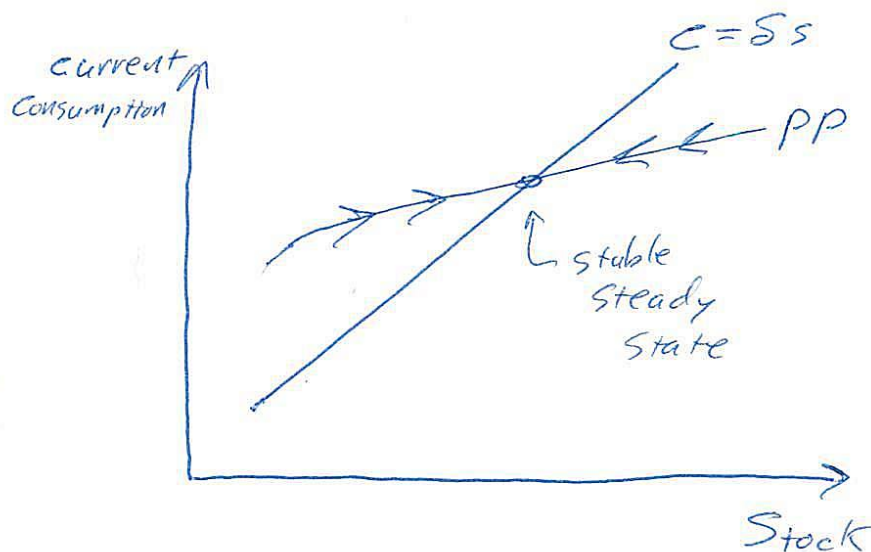- then a stronger cross partial effect increases the degree of adjacent complementarity

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STABILITY of STEADY STATE

depends on:
- rate of time preference
- rate of depreciation
- "cross partial"

A stable steady state is like the one in the Solow Model

If initial stock is below steady state level, then addict consumes MORE than stock depreciates until steady-state stock is reached.

→ Suppose that you could somehow reduce either the rate of time preference or the rate of depreciation or the "cross partial"

→ Reducing one (or all) of those three would change the SLOPE of the PP curve relative to the $c = \delta S$ line

→ If the reduction is large enough the steady-state could become UNSTABLE

If the steady state is unstable and some event occurs that reduces current consumption then current consumption will converge to ZERO
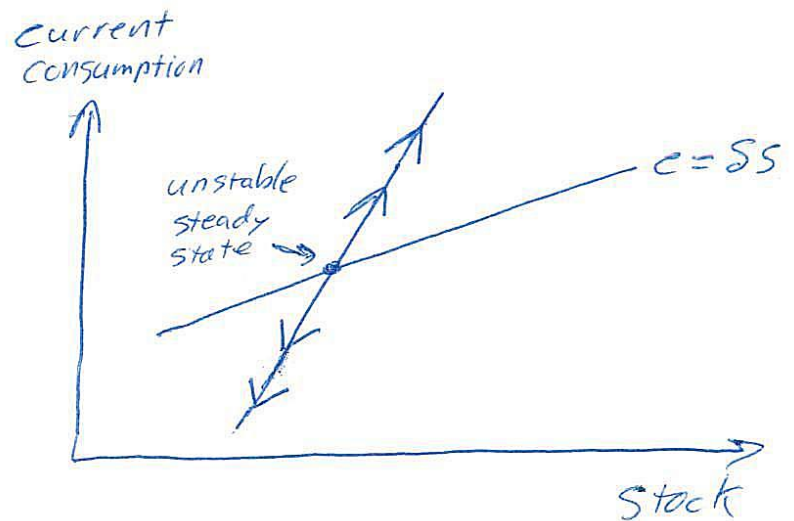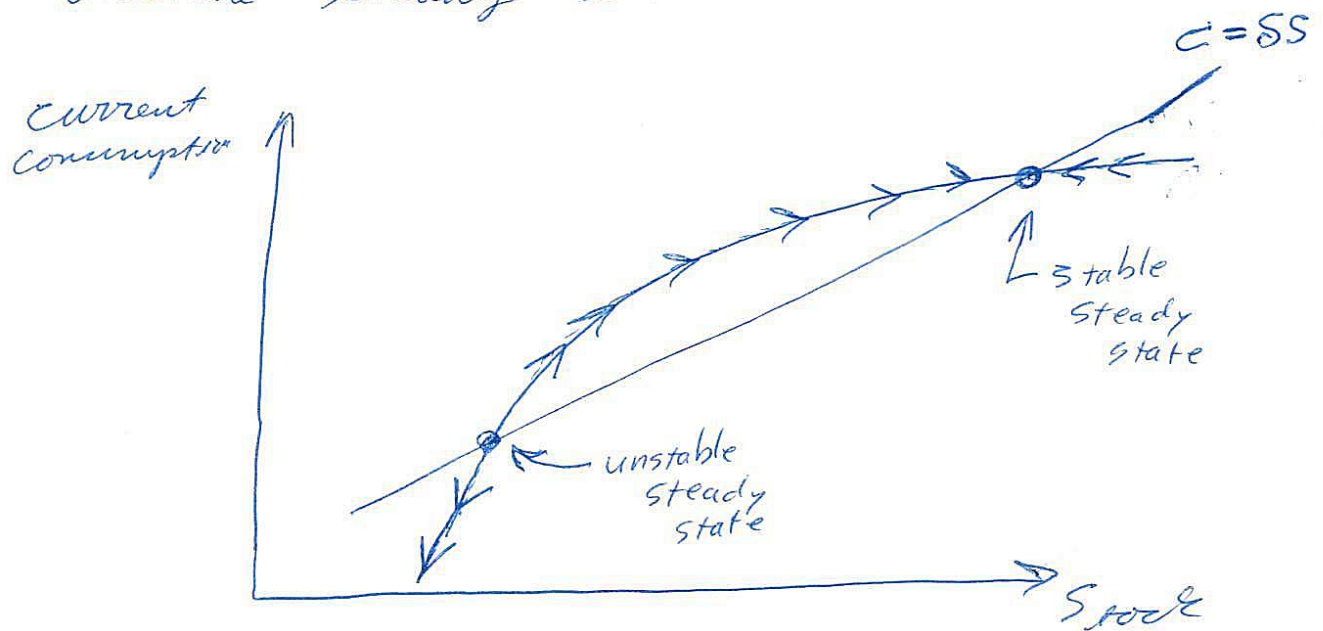

On the other hand, if some event increases current consumption, then current consumption will explode.

multiple steady states

→ if utility is cubic, there would be two steady states:
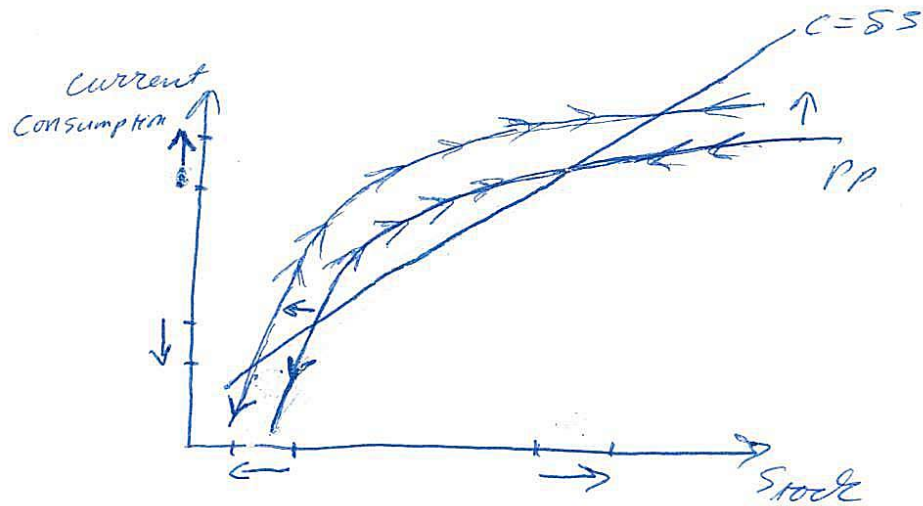a stable steady state and an unstable steady state

→ "With two steady states, relatively few persons consistently consume small quantities of addictive goods. Consumption diverges from the unstable steady-state toward zero or toward the sizable steady-state level. Therefore, goods that are highly addictive to most people tend to have a bimodal distribution of consumption with one mode located near abstention."
(Becker & Murphy, p. 683)

Permanent Decrease in Price

→ Suppose marijuana sales were legal Clearly the price would fall, but what would be the effect on consumption?

Graph: "current consumption" on vertical axis, "Stock" on horizontal axis, with curves labeled C=SS and PP

→ Unless the individual's initial stock is extremely low, reducing the price would push the individual to a higher steady state stock of the addictive good (as the PP curve shifts outward)

Temporary Decrease in Price

→ a temporary decrease in price will temporarily increase consumption

→ a rational addict's response to ~~crossed out~~ long run price increase should be greater than his response to a short run price increase

Quitting <u>Cold Turkey</u>

→ Now suppose that you are a
rational addict in high steady
state consumption of the addictive good.

→ ~~xxxxxx~~ Assume further that this
is a stable & steady state and
that there is an unstable steady
state at a lower stock of the addictive good.

→ If you (the addict) have the strong will
and self-control to endure the sizable
short-run utility loss associated
with "quitting cold turkey," then
you can shift yourself downward
to the lower steady state stock and
then onto zero

→ "Rational addiction" theory predicts that
strong addiction can only be broken
with "quitting cold turkey"

Becker, Grossman + Murphy
AER 1994

"Empirical Analysis of Cigarette Addiction"

→ empirical test of rational addiction model

→ data: per capita cigarette sales by state
for the period 1955-1985

→ dependent variable: per capita consumption

→ prediction to be tested:

- rational addict considers the future
consequences of his decisions

- myopic addict does not

- so past price increases should
reduce present consumption of
both myopic addict + rational addict

- but anticipated future price increases
would only affect present consumption
if the addict is rational

- "Are addicts rational?" = "Do they consider
the future when making present consumption
decisions?"

- when a one-period lead of price was added to the estimated 2SLS myopic model, its coefficient was negative + statistically significant
- increases in future price reduce current consumption
- sound rejection of myopic model

test of myopic

- cannot run same test with rational addiction model because the rational addiction model assumes that effect
- to test rational addiction model, ~~was~~ they tested whether past + future consumption ~~themselves~~ themselves affect current consumption
- results were consistent with rational addiction model's predictions:

  → past + future consumption increase current consumption

  → increase in current price reduces current consumption

  → long run price elasticities were larger than the short run price elasticities

Grossman + Chaloupka
JHE 1998

"Demand for Cocaine"

⟹ application of rational addiction model to
the demand for cocaine

⟹ two dependent variables
- "did they use cocaine? yes or no?"
- frequency of use (assuming they used)

⟹ price elasticities:

SOURCE: Grossman's Notes	long run	short run
participation	−1.03	−0.68
frequency (given participation)	−0.32	−0.28
(p.458) unconditional	−1.35	−0.96

⟹ cocaine consumption very sensitive to price
➔ a 10% decrease in price would cause:
- a 10% increase in users in long run
- a 3% increase in frequency (among users) in LR
- a 14% increase in unconditional frequency in LR

→ cocaine + marijuana are complements in consumption

→ cocaine + alcohol are substitutes

→ cocaine participation + frequency are higher in states that decriminalized marijuana (although the frequency coefficients ~~are~~ are not statistically significant)

→ an increase in the legal drinking age increases cocaine participation + frequency (although the frequency ~~coefficients~~ coefficients are not statistically significant)