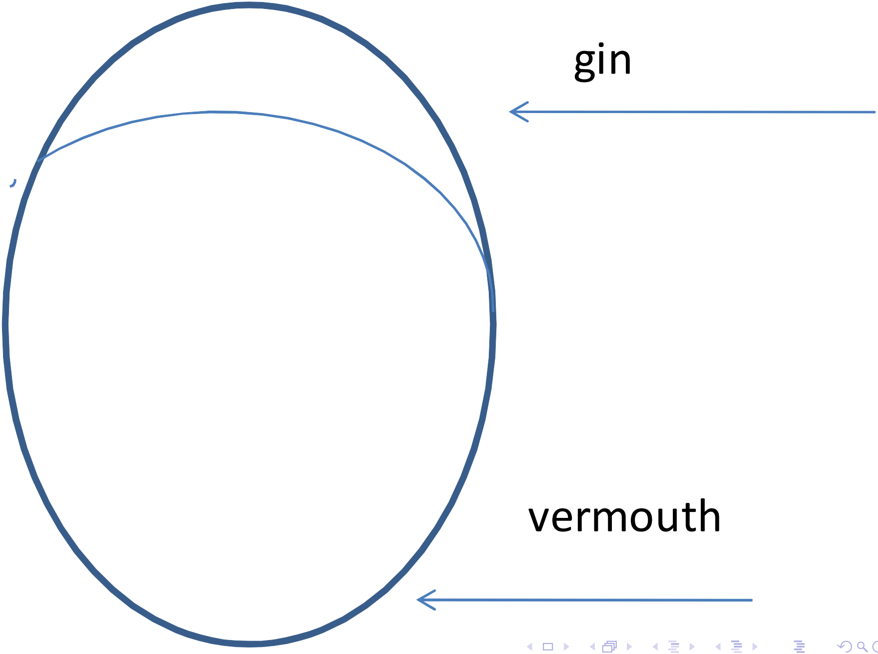
Accounting

- In chapter 2 in MM Schelling draws attention to the fact that some things are not choice variables at the aggregate level since many times accounting identities limit aggregate choices even if individual choices look unrestricted.
- Many of the accounting identities allow one to make surprising 'calculations'.
- Two particularly good examples are the following from MM.

Example

There are two glasses with identical measure of liquid; one of gin and the other of vermouth.
A spoonful of gin is transfered from the gin glass to the vermouth glass.
After a while a spoonful of liquid is transfered from the glass containing mostly vermouth back to the gin glass.

Is there more vermouth in the mostly-gin glass than there is gin in the mostly-vermouth glass?



The part of the spoon filled with gin must match exactly the part of vermouth which remains in the mostly-gin glass.
But then both glasses must contain exactly the same amount of the other liquid.

Example

A tennis tournament is played such that from each match the winner gets to play in the next round.
There are 137 players.
How many matches must be played?
The players must play as long as there are 136 losers, i.e., 136 matches.

- For any reasonable distribution one can calculate the median and the average.
- Many times students coming from different places have been the best of their classes.
- It comes as a surprise to them that once gathered together they all cannot be the best of their class.
- Actually half of them are below median.

Example

Maantiellä turvavälin tulee olla 80 km/h nopeudella vähintään neljä ja 100 km/h nopeudella vähintään viisi sekuntia.
According to the rule the safety distance must be four seconds at speed 80 km/h and five seconds at speed 100 km/h.
Think about a holiday season where many people go to Lahti, 100 km from Helsinki.
If they drive at 80 km/h they cover in four seconds about 88 metres.
If they drive at 100 km/h they cover in five seconds about 139 metres.
In the first case there will be 1136 cars between Helsinki and Lahti.
In the second case there will be 719 cars between Helsinki and Lahti.

Example

(continued) So, in the first case $\frac{4}{5}1136 = 908$ cars will arrive in Lahti in one hour from Helsinki while in the latter case only 719 cars.

Individually one can get to Lahti faster by driving faster but it does not hold in aggregate if people respect safety distances.

Of course, they do not but there are other constraints which lead to pretty much the same outcome.

- Stock market activities are many times reported as great selling or a deluge of selling.
- Presumably there cannot be selling without buying; sales must equal purchases in any market.
- Similarly if someone borrows money someone must lend an equal amount of money.
- During financial crises there are many times plans to forgive part of the debtors' debts; that is the same as taking money away from the creditors or someone else.
- During financial upturns one does not hear about plans where creditors should be paid more than they lent, or where people who did not lend money should be paid.

Example

Adverse selection or the lemons' problem.

Consider used cars whose values to their owners range from 10000 to 90000 to their owners; there is an equal number of cars of any value.

Let us index the cars by the sellers' valuation $x \in [10000, 90000]$.

The potential buyers value the cars such that a car $x \in [10000, 90000]$ is worth $x + 5000$.

The informational setting is such that the sellers know the values of their cars but the buyers know only the distribution of the values.

This means given any car they are willing to pay $5000 + (10000 + 90000)/2 = 55000$ for it.

But this means that only sellers whose cars' worths are less than 55000 are willing to sell the cars.

Example

(continued) But the buyers understand this and are willing to pay only $5000 + (10000 + 55000)/2 = 37500$ for a car offered for sale. But, again, only sellers whose cars are of worths less than 37500 are willing to offer them for sale at this price.
But the buyers understand this and are willing to offer only $5000 + (10000 + 37500)/2 = 28750$.
And this just goes on.
Let us figure out the following.
Is there a car x such that $5000 + (10000 + x)/2 = x$? Yes there is $x = 10000$.
Thus, the markets unravel or break down until only cars of worth 10000 are for sale and most potential gains from trade are lost.

Example

Tipping models.
These models capture the idea of critical mass.
A prototype is housing in a particular neighbourhood.
Assume that a particular neighbourhood consists completely of households of religion x.
These people are very sensitive and do not want to live in a neighbourhood where they have two or more neighbours of people of religion y. People of religion y, on the other hand, are very tolerant and do not care with whom they live.

Example

(continued) The neighbourhood looks like this

$$\begin{array}{ccccccc} x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \end{array}$$

Example

(continued) Then the owner of two houses dies and the houses go to the relatives who are of religion y.

They occupy the houses and the neighbourhood looks like this

$$\begin{array}{ccccccc} x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & y & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & y & x & x \\ x & x & x & x & x & x & x \end{array}$$

Everyone who has two$y$-houses as neighbours sells his/her house and move away.

Example

(continued) The only buyers are of religion y and then the neighbourhood looks like this

x	x	x	x	x	x	x
x	x	x	x	x	x	x
x	x	x	x	x	x	x
x	x	x	y	x	x	x
x	x	x	y	y	y	x
x	x	x	x	y	x	x
x	x	x	x	x	x	x

Example

(continued) The process goes on and after a while the neighbourhood looks like this

$$\begin{matrix} x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & y & y & y & y & x \\ x & x & y & y & y & y & x \\ x & x & x & y & y & y & x \\ x & x & x & x & x & x & x \end{matrix}$$

Example

(continued) and after this it looks like this

$$\begin{array}{ccccccc} x & x & x & x & x & x & x \\ x & x & x & x & x & x & x \\ x & x & y & y & y & y & x \\ x & y & y & y & y & y & y \\ x & y & y & y & y & y & y \\ x & x & y & y & y & y & y \\ x & x & x & y & y & y & x \end{array}$$

and after a couple of more rounds all the neighbourhood consists of people of religion y.

Self-fulfilling expectations

Example

Bank run.
Consider 100 people who can deposit a unit of money in a bank.
Next period it can be withdrawn.
In two periods it is worth $1 + r$ where the interest rate is $r = \frac{1}{10}$.
With probability $\frac{1}{10}$ each depositor gets a shock that forces his/her to withdraw the money and consume already this period.
People can insure against shocks by putting up a bank and granting early withdrawers $1 + s$ and late withdrawers $1 + t$.
Of course, $s < t < r$. Assume that $t = \frac{3}{50}$ and $s = \frac{2}{50}$.

Example

(continued) On average 10 units are withdrawn and 90 remain.
If x depositors withdraw in the first period each gets $1+s$.
Those who withdraw in the second period get
$(100-x(1+s))(1+t)/90 > 1+s$ if and only if $x < 11$.
If for some reason people think that there will be more than 10 withdrawals it is clever for them go withdraw their holdings.