Fractions and percentages

Q. What are some economic quantities that are expressed in fractions?
Headcount ratio for poverty, GDP per capita

As we discussed in the last class - when we have to denote a number that is not a full multiple of a unit, we use fractions. We divide one unit into a number of parts - the denominator, and we take some of those parts - the numerator. Eg. ⅔

Q. But how do we compare fractions - which is larger, ⅔ or ⅓ ? Obvious answer: 2/3

Q. Ok, not a more tricky one: which is larger ⅔ or ¾ ?

Using a line on the board (I always prefer line to pie-chart), we can see that ¾ is bigger.

Q. Why was the first one simpler to do?
When denominators are same. Since the unit line was divided into the same number of parts, it is easy to say the one with the larger number of parts taken is bigger

Hence, if we have the same denominator it is easy to compare (and, as we will see easy to add and subtract). In some ways, it is like having the same unit - for example if we ask which is larger 10km or 5 miles, it is hard to say unless we convert both into either km or mile. Similarly, if we want to say whether ⅔ or ¾ is larger, we have to make them have the same denominator.

Q. So, how do we change denominators of a fraction. If we are taking 2 out of 3 parts, how can we change the number of parts it is divided into?
[We multiply both numerator and denominator]

What does this mean - we can see graphically on the board that taking 2 out of 3 is the same as taking 4 out of 6, and the same as taking 6 out of 9. The actual part of one unit is always 1/3rd.
[Note: this is also why we can cancel terms in numerator and denominator eg. 20/25=4x5/5x5=⅘.]
So, this means that if we have two fractions, and we can convert them into the same denominator by this method then we can easily compare.

Q. There is a system where we make all fractions have the same denominator - can you guess what?
[Percentage]

Here the denominator is 100 so we can easily compare 5% with 10% and say 10% is larger. We can also add 5% to 10% to get 15%.

We use percentage very often in economics eg. GDP grew by 7%, inflation is 4% etc. Hence it is useful to understand how this works. A useful tool for doing such calculation are spreadsheets.

[Spreadsheet use shown in class]

Class exercise - use spreadsheets to answer the following questions

- If GDP grows first by 10%, and then again by 10%, how much does it grow by overall?
- If GDP first grows by 5%, and then shrinks by 5%, how much does it grow or shrink by overall?
- If GDP grows by 7% each year, how long will the economy take to double in size?