Fear of “innumerate and illiterate” asylum seekers arriving in Australia is immigration minister Peter Dutton’s latest broadside in the ongoing to-and-fro over asylum seeker policy.

Unfortunately for the asylum debate, numeracy is rather lost. In this regard, we can all learn something from the 1938 Physics Nobel Laureate Enrico Fermi .

Fermi was renowned for his back-of-the-envelope numerical estimates, having calculated the yield of the first atomic bomb blast based on the distance its shock wave carried some shredded tissue paper he had brought to the Trinity test .

He is also known among physicists for his “ Fermi problems ”, with which he livened up PhD oral examinations. It’s an approach that can be applied to the current asylum seeker discussion.

One Fermi problem that has been handed down to generations of physicists asks: “how many piano tuners work in Chicago?”.

The piano problem

This question has nothing particularly to do with physics. But answering it requires a skill that physics students should develop: the ability to make plausible estimates from reasonable assumed figures.

One response to the piano problem goes like this:

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There were about 500,000 households in Chicago, of which about a fifth have a piano, so there are about 100,000 pianos.

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If a typical piano needs tuning every two years, 50,000 pianos need tuning per year.

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If it takes a piano tuner three hours to tune a piano, a full-time worker (working 2,000 hours a year) can tune about 660 pianos in a year.

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So there's enough work for about 75 piano tuners in Chicago.

Of course, different estimates for the assumed figures will give different estimates for the number of piano tuners, but the point is the approach, and the order of magnitude of the result.

Fermi had an extraterrestrial version too: "Where are all the other civilisations in the galaxy?". One answer to this is summarised in the Drake equation.

At heart, the solution to the piano problem and the extraterrestrial Drake equation are similar: identify all the factors that affect the solution, make plausible estimates and multiply them out.

The refugee problem

We can apply the same approach to the increasingly divisive issue of asylum seeker policy.

In Australia, and in Europe, the debate has polarised into two camps: one driven by compassion for individuals escaping dire circumstances; the other by the need to regulate migration across national borders.

The "compassion" side recognises our common humanity, and our existing commitments to

provide asylum to those escaping persecution.

The “controlled migration” side recognises that there are limits to the capacity for any nation to absorb a sudden, large influx of immigrants. Indeed, Nauru, where refugees constitute more than 3% of its population, has had well-publicised problems.

In this confused situation, Fermi, who himself immigrated to the United States to escape anti-semitic laws in Mussolini’s Italy, might well ask:

How many refugees can the wealthy nations of the world accommodate?

The question, and its answer, is about capacity, not political will. But given this proviso, if the answer is “fewer than there are people in need”, then there is genuinely no solution to be found. On the other hand, if the answer is “more than there are in need”, then there is capacity, at least.

Crunching the numbers

So what’s the answer? The first part is straightforward: the number of international asylum applications each year fluctuates between one and two million .

The debatable part of the calculation requires an estimate of the number of immigrants a nation can take each year.

To give some Australian context , there are around 190,000 immigrants coming to Australia each year under our migrant program, and between 6,000 and 12,000 refugees arriving annually under our refugee resettlement program.

My estimate is that a wealthy nation can comfortably accommodate refugees up to about 0.2%

of its population per year.

Why 0.2%? Why not 1%? Well, after ten years at 1% annual intake, 10% of the population would be a first-generation refugee migrant. This is a number that will start to be felt as a significant demographic shift, with the potential for political backlash.

At 0.2% annual intake, it would take 50 years to reach this level. This is plenty of time for both immigrants and social structures to adapt and integrate.

For Australia, the current population is about 24 million so a 0.2% annual intake equals about 48,000 refugee places that we could comfortably resettle per year.

This is lower than our skilled migration program admits, and larger than the proposed refugee and humanitarian quotas of the Liberal party (18,750) and the Labor party (27,000). The Greens have a more expansive policy (50,000).

Indeed, this is the root of the political problem that some have described as " wicked ": the global demand for asylum dwarfs all of these numbers, so Australian politicians cannot unilaterally fix the issue.

Instead, they play at the edges, variously exploiting it for political gain or wringing their hands.

But resettlement should be shared across the Organisation for Economic Co-operation and Development (OECD) representing wealthy nations that can afford to carry the load.

The total population of the OECD nations is more than a billion. A resettlement rate of 0.2% across the OECD equals more than two million refugee places per year. This is larger than the typical number of annual asylum applications.

So Fermi has given us an answer: there is international capacity to distribute the flow of asylum seekers across the wealthy countries of the world.

An orderly and politically manageable process to achieve this requires international coordination. This is a diplomatic problem that Fermi can't answer.

But with political will, it has been solved in earlier decades of conflict-driven migration.

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Read more http://theconversation.com/a-bit-of-numeracy-can-take-the-heat-out-of-the-asylum-debate-59369