

MCDB 150 Global Problems of Population Growth Lecture 10 Notes

What event am I describing?

A ghostly stillness descended over this country today, with every restaurant, bar and tea house in the country closed, every store shuttered, and police patrolling the streets to make sure no citizen dared to step outside. NYT 12/1/97 pA1&A12

Avenues normally clogged with traffic were so empty that picnics could have been held on them -- except that nobody would have been allowed to attend. Plazas that are perpetual nightmares of congestion and exhaust fumes were abandoned to wandering dogs and cats.

It was also a good day for fish. Because the thousands of fishermen who line the shoreline on Sundays were all at home. The waterway itself, one of the world's busiest waterways was as flat and silent as a woodland pond. The Government decreed a six-month jail term for any citizen Turk who did not spend the day at home.

All in all, the country today looked like a land on which a neutron bomb had been dropped. Devastating the population while leaving buildings undamaged.

A national Census was being taken! It was taken manually - and on a single day.

The country is Turkey and the busy waterway is the Bosphorus

CENSUS TAKING

Compare this to census taking in NYC

Atlantic Monthly, Feb. '93 p47-48

An educated and motivated guy got one of the temporary jobs as a census taker. He was high class enough to get his description published in the Atlantic Monthly.

He was 6' 4" Caucasian. They sent him to Chinatown.

People took one look at him and slammed the door.

Others offered him money to go away.

One old woman burst into tears at the sight of him.

Even most of those who tried to cooperate did not have time to fill out the long form.

He asked to be assigned to another area. He got Wall Street.

Same story - no one would cooperate with him.

He couldn't even get in to one building. So he climbed to the roof of the building next door - jumped to the roof of the building he couldn't get into.

How's that for motivation!

There, on the roof, was a big dilapidated shack. He knocked on the door.

Someone inside flung open the door - Inside he could see several apparently naked people lying on hospital gurneys. The man who had opened the door was wearing a white coat. "Go Away, he screamed, I'm giving my wife a Cancer treatment."

A more experienced Census Taker told him to "curbstone it."

You sit on the sidewalk and guess how many apartments are in the building and fill out that many forms with guesses about how many people live in each apartment.

The National Academy of Sciences did a study of the 1990 census.

1. It was the most expensive ever.
2. It missed more than 2 million children (mostly minority children).

Imagine what this does for school planning and knowing how fast our population is growing.) Pop Today 8/99

3. It missed more than 10 million people
4. It double counted, or counted in the wrong place another 6 million people.
5. Between censuses, the census bureau uses the previous census's data to make projections of how the population will grow.

Errors in the original census get carried forward and magnified.

As a result of the carry forward, the Year 2000 census. found almost 7 million more people than the Census Bureau thought we had. (NYT 12/29/00 , PRB Feb Mar '01 p2)

Does the slop in censuses matter?

NYT 3/2/01: More than \$185 billion a year in federal aid to states is apportioned by population as recorded by the census.

Also, after every Census. the House of Representatives is reapportioned depending on the population counts.

Why is the US census so bad?

Because of politics.

It is well known that it is primarily

minorities, immigrants and poor people who don't get counted.

Those people generally vote Democratic.

Ever since the 1990 census missed more than eight million people, Democrats have pressed for some way to account for those most often overlooked.

But, a Republican redistricting expert wrote a memorandum in 1997 predicting that adjustment could cost the Republican party 24 House seats.

Since then, Republicans have consistently blocked modernization of the Census.

For the Year 2000, Pres. Clinton appointed a new Director of the Census Bureau: Martha Riche.

She came out of a scientific and research environment.

When she came into office she announced that

"All Industrial Democracies will be holding a Census in the Year 2000.

We want the US to win the Gold Medal for accuracy!"

That was stupid, she thought her job was to conduct an accurate census.

To avoid a repeat of the inaccurate 1990 census, she proposed using modern demographic techniques, lumped under the rubric: Statistical Sampling.

Basically, you know where you are missing people, you go back - do a really careful job in a few areas and then extrapolate to all the poorly counted areas.

When Martha Riche said that the Census Bureau was going to do this -

Newt Gingrich, Republican Speaker of the House, said –

Well, you can do that, but if you do, we'll just cut your budget appropriation to zero.

She eventually resigned, basically saying that Congress wouldn't let her do her job.

The census was done the old fashioned way. It cost \$1.7 billion more than w/ sampling and was not as accurate.

NYT 6/3/99; NYT 3/2/01 U.S. Census Bureau Rejects Revision to Nation's Tally

Similar political considerations occur everywhere.

Consider birthrates in China. The Gov't is strongly trying to push the birth rate down. Do you think district officials are going to admit that they haven't done their job - that the birth rate in their district is higher than the target? No Way.

Now the UN collects these data and tries to correct for known biases.

But, who owns the UN. The member countries.

Consider a conservative, religious country. What if a UN demographer says, contrary to official government statistics, that there is actually a high rate of illegitimacy or abortion in their country?

No Way, it's only in the decadent West that such things happen.

That demographer is going to have to save his skin.

So you can look up info from, say, the UN Demographic Office or the US Census Bureau. And they will be different. Same question, same raw data.

Different conclusions.

In Nigeria and Sudan, there is huge conflict between Muslim Populations in the North and Christian Populations in the South. The big Biafra war in Nigeria; the ongoing civil war in Sudan. Both involve millions of deaths. When censuses are taken the ratio between religious and ethnic groups are the key outcomes. You can bet that these are fudged as much as possible.

Nigeria: had a reasonably accurate census in 1952-53.

Then Biafra War (1967-70) Censuses in '62, '63 and '73 were controversial.

'92 census: accepted official figures in Nigeria 88.5 Meg.

But World Bank (World Development Report '94) reports '92 population as 102 Mg

and UN estimates 120 Meg. Dickenson: Geography of the 3d World, Routledge Pub.

POINT 1: Even the simplest of numbers, like nose counts, have systematic errors built in. Often intentional.

Look across the top:

There is the MID 2008 World population - 6.7 Billion -

SLIDE 12

Look at the birth rate:

21 / 1,000 population (World Pop Data Sheet, 1999)

SLIDE 13

How accurate is this? Hard to know.

One major problem is that the births of about 50 million babies each year, worldwide are not registered. Pop Today 7/02 UNICEF via Reuters 7/8/98

That means that ~1/3 of world's children have no birth certificate.

Because of the (presumed) great control of the government over reproduction in China, China is sometimes considered an atypical situation.

So statistics are often presented w/ & w/o China to give a presumably more characteristic picture.

You'll hear more about China later in the course.

Look at difference in birthrate between more developed and less developed countries.

SLIDE 14

12 vs 23 Double the birthrate.

or 26 w/o China

And for the least developed countries 36

triple the developed country birthrate.

Now look at the Birth rate for the whole world and the less developed world.

They are about the same. (21 vs 23)

But very different from the developed world. (21 vs 12)

That's because such a huge fraction of the world's population is in the developing countries. Thus, they carry the weight in averages.

This predominance will increase

SLIDE→16

The low fertility of developed countries will become less and less important for world statistics as they become an ever smaller fraction of total world population.

Unless more and more populations join the ranks of the low fertility countries.

Statements about what is going to happen to the world based on the current low fertility of developed countries are really guesses!

POINT 2: What's going on in the high fertility countries is characteristic of the world.

Now look at the DEATH RATE

The death rate for the world is 8 per thousand.

Now compare the birth and death rates:

21 Births 8 deaths

SLIDE→17

More than 2 ½ births for every death.

That is the best measure of how far the world has to come to achieve Population Stability. The birthrate has to fall – or the death rate rise by a factor of 2 ½

In the developing countries (excl. China), the birth rate is 26 vs death rate of 9

The birth rate is TRIPLE the death rate.

SLIDE→18

Even in US: There are 14 births for every 8 deaths

SLIDE→19

USCensus Web Site and Audubon Pop & Habitat Campaign 9-10/99. In Chimp war folder.

Those numbers show you how far away the world still is from population stabilization.

POINT 3 So that's point 3 for the lecture: the birth rate is ballpark double or triple the death rate. We are very far from population stabilization.

But, unlike the birth rate, the death rate is not so different between the developed and developing countries.

9 per thousand vs 10.

SLIDE→21

You've heard in an earlier lecture, that a typical pre-modern death rate is ~40 / 1,000.

So, at 9/1,000 the death rate is already way down.

Pretty much everywhere in the world, the death rate has done most of its falling. Future changes in population won't be due too much to further drops in the death rate - but will be primarily dependent on the birth rate.

Unless of course disaster happens and the death rate starts climbing again.

Absolute # of deaths in Egypt has remained pretty constant

Egypt Slide---->23

Has death rate stayed constant in Egypt?

No, it has decreased.

Because the total population is increasing, while deaths are staying steady.

Always pay attention to RATE.

There are exceptions - again sub-Saharan Africa (SSA) which has a death rate half again as high as the rest of the world.

So that's POINT 4: With the exception of SSA, further decreases in death rates are not going to have huge impact on world population.

Rises in the death rate from aging and from AIDS may have a bigger effect.

Changes in fertility rates will have a huge impact.

Notice anything funny so far??

SLIDE→25

The developed world's death rate is listed as HIGHER than less developed world!!

What do you think is the reason for that??

Well, before jumping to hypotheses - we better check if our data is right.

Maybe this is just rounding error.

How can we check that?

Lets compare some individual countries

Let's try the US and Mexico

Mexico --→29

Uh Oh!

Death Rate for US = 8

Death rate for Mexico = 5

US has almost twice the death rate of Mexico.

In fact US is worse than (or essentially tied with) every country in Central America or the Caribbean.

Only Haiti is significantly worse.

Maybe these holistic and folk medicine people are right and Western Medicine and life style are lousy.

Clearly this is contrary to what you would have expected.

Maybe what I've said in previous lectures about the ineffectiveness of traditional and alternative medicine is just plain wrong.

The answer is that the Mexican population is much younger than the US population. The US has a much greater proportion of old people.

And the death rates among older people are higher than for younger people.

US Death Rate vs. Age---->3

You can imagine the same age problem messing up interpretations of fertility rates, what percentage of a population is in school - etc.

In fact almost every demographic measure is very affected by age.

POINT 5: Demographers wouldn't dare try to interpret numbers unless they knew something about the age structure of a population.

The easiest way of visualizing the age structure of a population at a glance

is a graph called a population pyramid.

GERMANY Describe pyramid (it uses 1 year increments).

---->Germany 4

Total population is filled-in area (=area under the graph).

Can see whole modern history of Germany in the pyramid.

India: severe age heaping. People only know their approximate age

INDIA 36

Soviet Union: Age Heaping

---->Soviet Union 37

?What's this a pop pyramid of?

---->Sun City Arizona 38

The overall shape of a country's population pyramid is its most important characteristic.

Slide of 2 population pyramids More & Less developed regions

---->Fig. 39

Nigeria is an example of a developing country

Fig 40

Why does its population pyramid balloon out?

These bars are the group of child bearing women.

Each couple in this group is having more than two children.

These bars are the children they are having.

There are more children than adults.

Of course, some of the decrease in numbers with age is mortality.

Compare with a low fertility country

Fig 42

The cohort of fertile adults is having just about enough children to replace themselves.

This results in approx equal numbers in all age brackets (except oldest)

Actually, the fertility rate is less than 2 children/woman so the base is shrinking.

The shape of the population pyramid correlate w/ lots of socio-economic variables:

Underdeveloped economy, low educational levels, low status of women, etc.

POINT 6 Population Pyramids are the easiest way to visualize the age and sex structure of a population.

POPULATION MOMENTUM

What happens in the next 5 years?

The whole pyramid moves up.

The oldest group dies - but there's a new larger bar added to the bottom.

The women that were aged 40-45 stop reproducing.

But a new bunch of women that were teenagers (10-15) now come into their childbearing age (15 and up).

Compare the sizes of the two COHORTS.

There are many more teenagers entering their reproductive ages than older women leaving.

The number of women of reproductive age increases.

They each have more than two children - More children are born than in the previous 5 years.
The population increases.

So, the population increases for two reasons:

More women of childbearing age – each having more than 2 children.

The total increase in cohort size is the product (not the sum) of these two effects.

Well here is the trajectory of that effect.

of childbearing women 8

Now at the same time, The fertility rate of the world is coming down.

----># of fecund ♀♀ & TFR 9

So, as the fertility rate falls, the # of childbearing women increases.

The number of babies is the product of these two.

The number of babies continues to go up.

---->colored bar chart 10

That's called POPULATION MOMENTUM.

Total Momentum contribution to population growth ---->11

What happens, or doesn't happen, to fertility today

has repercussion way into the future.

POINT 7

IN THE WORLD TODAY, FERTILITY IS FALLING BUT POPULATION IS STILL RISING.

POPULATION MOMENTUM IS THE MOST IMPORTANT FACTOR FOR THE FUTURE.

Population Pyramid

Developing Countries vs. Developed

--->with 2025 projection 12

A developing country's pyramid is close to a triangle.

If you get a miraculous fall in the birthrate, so that the fertility drop immediately cancels the increase in number of childbearing women.

Then the number of children born stays constant.

The triangle eventually becomes rectangle.

The area of a rectangle is double the area of a triangle, so population doubles.

But no immediate miraculous transformation to 2 children is expected to happen

actual projections for world in 2025 --->12

Because fertility has already come down to replacement levels in a good chunk of the world, and IF fertility continues down, the world's population will not double again.

POINT 8: Barring some drastic unexpected change,

POPULATION WILL INCREASE BY ~50% IN THE FUTURE

HOW LONG DOES MOMENTUM LAST?

It takes a very long time from when the fertility drops to when the population actually stabilizes.

First, this large cohort of young people must come into their reproductive ages. The number of reproductive age women keeps increasing while these cohorts reach reproductive age – that's one whole generation.

Then you get the aging effect -

The population keeps increasing at the older ages as all these people pass up the age ladder. This takes another generation or two.

Here is one example from Mauritius

Mauritius---->13

Mauritius has done a fabulous job reducing its fertility rate

Dotted line starting in Top Left

Starting at a rate between 6 and 7, which lasted until the 1960s,

The Fertility rate dropped precipitously to ~2 children in the 1980s.

But look at the population increase:

basically you can't see any effect yet on the population growth rate.

Here are some projections about final population stabilization.

150 years---->14

Nigeria:

Now ~120 million

Reaches replacement level fertility 30 yrs from now (fat chance)

at more than double its current population

And then population keeps increasing for another 150 years

During which time it adds as many people as its total population now.

Finally reaches stabilization in 2150 at over 500 million. (fat chance)

Bangla Desh: 125 Years

Iran: 110 years

Brazil: 145 years

POINT 9

Momentum lasts a very long time.

Fertility changes now are amplified tremendously because they take so long to work their way through the age structure.

Consider what this means for an individual country.

ALGERIA: Data from: Algerian Maternal and Child Health Survey.

Reported in: Studies in Family Planning: 25: p 191. 1985

---->15

	1965	1985	% change
Crude Birth Rate /1,000	50.1	38.0	- 24.2
Fabulous progress for a country just coming out of a horrific War of Independence w/ France.			
But Population Growth Rate	2.42%	2.87%	+18.6%
(%/year)			
Population (millions)	11.9	21.8	+83%
Annual Pop Growth	288,000	626,000	+217%

WINDOW OF OPPORTUNITY

This momentum issue is of tremendous importance for the future of the developing world. Countries may have only a window of opportunity for modernization.

Algeria and Egypt, both having made much progress, are on the verge of collapse.

I was in Egypt some time back and this is my take on what is happening.

As we have seen for Europe, per capita progress in standard of living depends on the race between increases in productivity and increases in population.

In Egypt, gains in the economy were counterbalanced by population growth.

They also wasted huge amounts of money and effort on the us versus them conflict with Israel.

So the people saw too slow or no improvement in their lives. They gave up hope in secular progress, and turned to religious fundamentalism and to a more local communal form of social welfare. This same story may be characteristic of a lot of countries.

POINT 8. We saw for Europe that the industrial revolution was not sufficient for a dramatic rise in per capita income. Only when it was coupled with the fertility decline, did major progress come about.

The developing world has the same problem, but with a nasty twist.

Modernization has come upon the 3d world so rapidly, and so obviously from the outside - that they don't have any reason to trust the changes that modernization requires.

If modernization is not accompanied by obvious progress in the quality of life, people may give up on modernization totally and try to revert to some imagined golden age of religious or cultural superiority.

There may be only one window of opportunity for modernization.