

Joel E. Cohen

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Jacques Gordon: Could you talk a little bit about the nature of demographics, the field of population science, and some of the cross-disciplinary work you've been involved with?

Joel Cohen: Classical demography deals with birth, death, and migration. Recently, demography has undergone some changes. Within demography, the study of migration, for example, has gone beyond simply counting numbers of people arriving and departing to studying how migration is affected by networks of relationships through kin or acquaintance and by economic factors—factors outside demography. The study of death rates has gone from how many people have died from a particular disease to the role of sexual behavior in the transmission of HIV, the role of education—again, going outside demography. Fertility, the third central variable of demography, really is the study of the great unknown: why people choose to have children or not and how many they have. For some people, it is not an active choice, but for many people it is increasingly an active choice. Demographers base population projections on that choice, and yet we have very little understanding of it.

Relations with geographic information systems, plotting where people are, are also a revolution in demog-

raphy. The first digital map of the world's population became available only in 1995. It opened up all kinds of possibilities relating population to endangered species, carbon dioxide production, economic activity, tectonic plate movements, all kinds of geophysical hazards. Population Action International and Columbia University just published a map projecting future population growth spatially, not at a national level but at a very local level. That is the first time that has been done. And then there is more interaction between economics and demography, economics and all the social sciences, demography and the environmental sciences.

I have always understood the science and the study of demographics to be about the long wave, with few dramatic changes quarter to quarter or year to year, the way we may see in economics or finance or geopolitics. But when you talk about topics such as immigration, fertility, and spatial distribution, we see surprises in your field that are not just relevant for 10- and 20-year planning, which is where pension readers' understanding of demographics comes from. Could you describe the various time scales your discipline works with these days?

There are multiple time scales. On the very short time scale, the 1918 influenza pandemic killed tens of millions in a very short time. The Chinese Cultural Revolution probably resulted in the starvation of about 30 million people over a year or two. The HIV/AIDS pandemic, which has probably killed about 20 million people and infected another 40 million who are still alive, has had a very substantial effect in some countries over a period of maybe 5 or 10 years, which is pretty short on the demographic scale. On the fertility side, after World War II there was the baby boom and then the baby bust in the United States but not around the world. On a slightly slower time scale, the population growth rate of the world reached its all-time peak of 2.1



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percent a year around 1965 to 1970 and dropped to 1.1 percent—almost half—by the end of the 20th century. That is a decadal-scale drop but tremendously dramatic.

Demographics teaches about very dramatic short-term events as well as longer-run events that actuaries are used to dealing with on behalf of our pension funds. One you didn't mention, which is huge for real estate investors, is the rate of urbanization and the extent to which people who live in rural areas move to cities and exert pressure to produce housing, shopping areas, infrastructure, and the rest of it. Is this an area that also belongs in the study of population sciences?

Absolutely. First let me say a little about where we are now and then about what people can expect for the future. The year 2007 is supposed to be the year in which the fraction of world population living in cities reaches one-half. From 2007 onward, the future of humanity is urban; we are ending the stage in human history where more people live in the countryside than live in the cities. But this process is not uniform across the world. Of the roughly one-fifth of people who live in rich countries, about 76 percent live in cities. In poor countries, roughly 41 percent live in cities. Those cities occupy about 3 percent of Earth's land area where there are people, so I'm excluding Antarctica. If you look at the places where there are people, 3 percent of the land area has half the people—the urban people—and they live in an average density of 500 people or more per square kilometer. The half of Earth's land that is least densely populated has only about 2 percent of the people. So half of Earth is very thinly populated, fewer than 10 people per square kilometer.

The average number of children per woman per lifetime is lower in urban regions than in rural regions. That is true in every region in the world except for parts of sub-Saharan Africa. Right now, 6.5 billion people live on the planet, and the United Nations' medium projection for 2050 is about 9.1 billion. Virtually all that 2.6 billion increase will be in the cities of poor countries. The rural population of the world will hold steady at about 3 billion. In very round numbers, let's say we have 6 billion people: 3 billion urban, 3 billion rural. In the next 45 years, when we add another 3 billion urban, we'll go from half urban, half rural to about two-thirds urban, one-third rural. We'll go to a primarily urban world.

So even as the rate of total growth may be lower than it has been in the past and may fall further, the rate of growth in rapidly urbanizing populations in emerging markets is going to be phenomenal.

That is exactly right. Today, the world grows by about 75

million people a year; 95 percent of that growth is in the developing world, and 5 percent is in the rich countries. By 2050, the U.N. estimates, today's developed countries will be declining by 1 million people a year, and today's developing world will be adding 35 million each year, so the net will be 34 million, about half as fast an increase as today's. Here is the paradox: If urban areas have lower fertility, how is it that they are growing more rapidly? You said it earlier: People migrate from rural areas into urban areas. That will pose an interesting challenge.

If the world goes from 3 billion to 6 billion urban people in 2050, it means that as much urban structure will have to be built by 2050 as exists now. Here's another way of looking at it: There are 2,340 weeks in 45 years. If the world is going to grow by 2,600 cities of 1 million each by 2050, then we're going to have add the equivalent of a city of a million people in the poor countries of the world every week for the next 45 years. The challenge of building that infrastructure is colossal.

It is probably a useful heuristic to talk about 2,600 cities of a million each, but I'm sure you're going to come to the fact that the distribution pattern is not going to look anything like that.

Over the next 15 years, 93 percent of the people added to cities will be in the poor countries; 45 percent of all people will live in cities of less than a million (in other words, approximately a half); 28 percent will live in cities of 1 to 5 million. Roughly the remaining quarter will live in large cities. The number of small cities is increasing much more rapidly than the number of big cities. So a million people is roughly the midpoint of the distribution of cities, and it's in the not-tiny-not-colossal range that we expect most of the building to happen.

A rough ballpark would be that most of the growth will be in cities between, say, a quarter of a million and 2 to 3 million, not necessarily in the mega cities.

That is exactly right. In fact, the population of mega cities is growing more slowly than the population of middle-sized cities.

Why? Are the mega cities reaching a scale where they are no longer attractive to immigrants and are just too big to function?

There is a chain of migration. Most people who move from a rural village or community move to a relatively small town. People who have spent some time in a small town move to a slightly bigger town, and people in a middle-sized city move to a slightly bigger city. People who move to the top of the pyramid—the mega cities—generally, not



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always, have had experience in a substantial-sized city. There is a cascade effect, and at each stage in the process, some people stay where they are and don't keep moving. There is a buildup from the lower end rather than a torrent of people moving straight into the biggest cities. The bigger cities in developing countries also have well-known problems—quality of life, sanitation, lack of employment opportunities, inadequate housing. Many people find it more promising to make their way in smaller-sized cities.

Another reason bigger cities are not growing as rapidly is that modern contraceptive use is more prevalent the bigger the city. And fertility rates are lower the bigger the city. A city grows from two sources—migration and natural increase (births over deaths). If the rate of births over deaths is lower and the other is held equal, which it is not, you would expect bigger cities to grow less rapidly just because they have a smaller engine of natural increase.

Our readers are now involved in the funding of hard assets that would include certain kinds of infrastructure. The question is, Will the assets in these economies be able to pay a reasonable rate of return? The demand will be there, but will the ability to pay rent or pay for all these urban structures also be there?

It depends on what we do in addition to building real estate. Cities have really important benefits: They can concentrate economic productivity, cultural assets, and resources for education, public health, and medical care. If cities were appropriately designed, they could promote energy efficiency and an adaptation to an increasingly elderly population. If the people who are building and designing and governing cities make the investments in the quality of the people—in education and health—those people can be income earners, they can be productive, and they will be very, very happy to pay for housing and infrastructure and public buildings of good quality. So the question is, Do people want to make the investment in human beings to make them productive so they can afford to pay for the housing they are going to need?

What other challenges do cities face?

People like to live along coasts, and there is a good reason. The oceans are the most economical way to transport goods. But many coastal cities have poor luck: They are in tectonic fault zones and so are prone to earthquakes, exposed to rising sea levels, and exposed to coastal storms. As we heat up the atmosphere, the energy in those storms increases—I needn't say any more than Katrina. Cities are also places where assets are concentrated, making them more attractive to military and security threats. It is no ac-

cident that one of the 9/11 attacks was on a large city. And unless cities have health infrastructure, they are incubators for infectious diseases.

We in real estate are very acutely aware of those challenges. We tend to try to pool our risks on earthquakes through insurance, but it is becoming clear that insurance companies are underwriting the coasts differently than they are other regions. The risk-return trade-off is between the higher level of economic activity and wealth on the coasts versus the higher costs of doing business there, which includes insurance and the risks you just mentioned.

Absolutely. I would say insurance is not enough. There has to be proactive redesign, so that people think ahead of what is inevitable as a threat and design to reduce damage.

Similar planning needs to come in response to another concern I have about cities. I said earlier that cities are about 3 percent of land. Many of today's large cities were founded in the middle of prime agricultural land because transport then was difficult, and where agricultural land was good, you could feed a lot of people. Many cities that occupy 3 percent of land are located in the middle of the 10 percent of land that's really good for agriculture. If cities double in population and double their area over the next 50 years, they could eat into an agriculturally productive base that feeds them. I have seen a response to that challenge that was very dramatic. I went to Amsterdam, rented a bicycle, and pedaled about 20 minutes from the heart of downtown. I went under a bridge, and suddenly this very dense city changed to countryside; there were canals and cows in the pastures. It was like crossing an invisible line where Amsterdam had said there will not be urban sprawl. The contrast between that and Los Angeles, New York, or any of the huge American cities is enormously dramatic. Amsterdam is an example of a city that planned to protect the assets that make it a viable city.

Many European cities have that tradition of the green belt and the protection of farmland. Certainly the American land planning system seems to be much more market oriented, which is ironic because zoning of any kind is really not a market event. The sprawl you describe was regulated into existence in an era when gasoline was cheaper. The 1950s and 1960s zoning is still on the books. If it were truly a market landscape in the United States, you might see higher density in the zoning. You are reminding us that the shape of the cities that are going to need to grow is very much within our control as a society, be it through a market institution or a government institution, and we should be more thoughtful about the way we use the land.

Amen. Let me propose another topic: the aging of the world population. The composition of people in cities

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of the future will be very different from the composition of cities today. I said earlier that 2007 will be a watershed year in which more than half the world's population will be urban. The year 2000 was a watershed year in which more than half the world's people became elderly. Let me be more concrete about what that means: The fraction of the people in the world who were 0 to 4 reached a peak of around 15 percent in 1955 and dropped to 10 percent by the year 2000. The fraction of people who were 60 plus was around 8 percent in 1950 and grew to 10 percent in 2000. From here on out, the fraction of 60 plus is anticipated to rise to about 22 to 23 percent by 2050, and the fraction of 0- to 4-year-olds will drop to about 6 or 7 percent, meaning for every person 0 to 4 by 2050, there are going to be at least three people 60 plus. People who have grandchildren are going to be a lucky minority. The number of people age 60 plus will nearly triple by 2050, and the number of people 80 plus will more than quadruple by 2050. Both the numbers and percentages will grow most rapidly in today's less-developed regions. The reason is that today's more-developed regions have already begun to experience the aging revolution. For example, there will be 6.6 times more people 80 plus in less-developed regions by 2050, whereas the number of people 0 to 14 will be about the same as now. In today's rich countries, people 80 plus will be 2.6 times more numerous; the number of people 0 to 14 will drop in absolute numbers by roughly 10 percent. This aging results from two successes—lower fertility and longer life. If birth rates remain low and death rates remain low, this aging is completely irreversible. It is not happening uniformly; it is happening more rapidly in today's poor countries.

That certainly has huge implications for how pensions are funded and how a retired population is supported. Somebody is going to have to pay into the pension plan so that they or others can withdraw benefits.

Yes. Along with the age structure, household composition has changed. In 1850, about 70 percent of U.S. white persons age 65 plus lived with children; in 1990, about 12 percent of U.S. white persons 65 plus lived with children. In 1850, about 11 percent of U.S. white persons lived alone or with a spouse only; by 1990, almost 70 percent lived alone or with a spouse only. The housing that needs to be built in future cities had better be designed with old people in mind—door latches instead of knobs, access without steps, supports where needed. It is not going to be just a carbon copy of today's real estate, or it will not work. Real estate that offers nearby shopping and cultural resources and is appropriate for an energy-constrained

world where an elevator might be costly—that is going to be a challenge to the real estate industry.

Back to the zoning discussion we had before: A lot of communities are still built on the principle of a separation of different kinds of land uses, perhaps a holdover from industrial society where you didn't want to be next to the factory because it was not a pleasant place to raise all those 19th-century children you mentioned. But our industry is struggling with the emerging trend in real estate to re-explore mixed uses that are much closer together, uses for living, working, shopping, and leisure. Certainly other hot areas for retirement communities are college towns. People are living longer, and their minds are active longer, and they still want to be around universities to learn new things well into an older age, which I don't think we've ever seen before in this society.

I hope real estate people will take education seriously at every level. It is a really good investment. It may not be a traditional part of the scope of thinking, but when people are thinking about planning communities, if they can invest in education parks for all ages—from preschool up to post-retirement—they will find themselves building attractive, vibrant communities for people who are healthier and more productive and have better incomes.

Are there other topics we should review?

We have not covered how atypical the 20th century was. It was the only century in the history of humanity in which population doubled and tripled in a single lifetime; that will never happen again. It was the century with the largest voluntary decline in fertility that humankind ever experienced. It was the last century with more young people than old people. It was the last century with more rural people than urban.

Demography is not destiny. We can shape the future of fertility, mortality, migration, urbanization, and even the economic and social impact of aging by the investments and choices we make now and tomorrow and the day after. If we give people control over their fertility, we will have a better world than if we insist they are not able to make their own decisions about fertility. If we give people education so they can protect their health, we will have healthier, more productive, and richer people. If we design our cities not by codes and regulations from the last century but for what we need for the next century, they can be very wonderful places to live. If we don't do that, they can be hellholes, and we have plenty examples of those on Earth now—we don't need more.

Thank you so much, Joel. ■