

Lesson 13

“The More Things Change, the More Things Stay the Same”

Kristin’s Story - Chapter 8

It was 2018. Kristin friend’s Raphine had decided to return to Kenya and rethink his career goals. Kristin also struggled with some of her own career and financial decisions. She thought about buying a house but was nervous about the financial aspects – specifically mortgage payments, insurance, and possible repairs and remodeling expenses. She liked to think that in the future she might move to other cities or even to other countries and owning a house might make moving difficult. There was a sense of freedom she worried would be lost if she owned a home. Several of her friends were also questioning whether or not to buy a house or rent.

The population of the United States was changing. Generational labels were often tossed around, and sometimes Kristin wondered if they made any sense. The Boomers were declining, and the Millennial generation was now called the “power generation”. A label of the Z Generation was starting to catch on. She was not sure what that all meant, but she did sense that her own goals were a mixture of her parents’ generation and the generations younger than her.

These changes made Kristin often think a lot about her future. Sometimes it made her nervous, and sometimes hopeful. Was this the beginning of new things, or was this more of the same?

Lesson 13 – Problems

Handout needed to complete the following problems: Handout 6: *United States 2010 - 2050*

1. In what way does Raphine’s decision to leave the country in 2018 change the count of people in the United States?

It has been previously mentioned how buying a house impacts a country’s economy. Although the specifics of home ownership and its impact on a country’s economy are more thoroughly explained in an economics class, buying a house generally involves taking out a loan (called a mortgage) from a banking institution. The mortgage is paid back with interest. The bank also

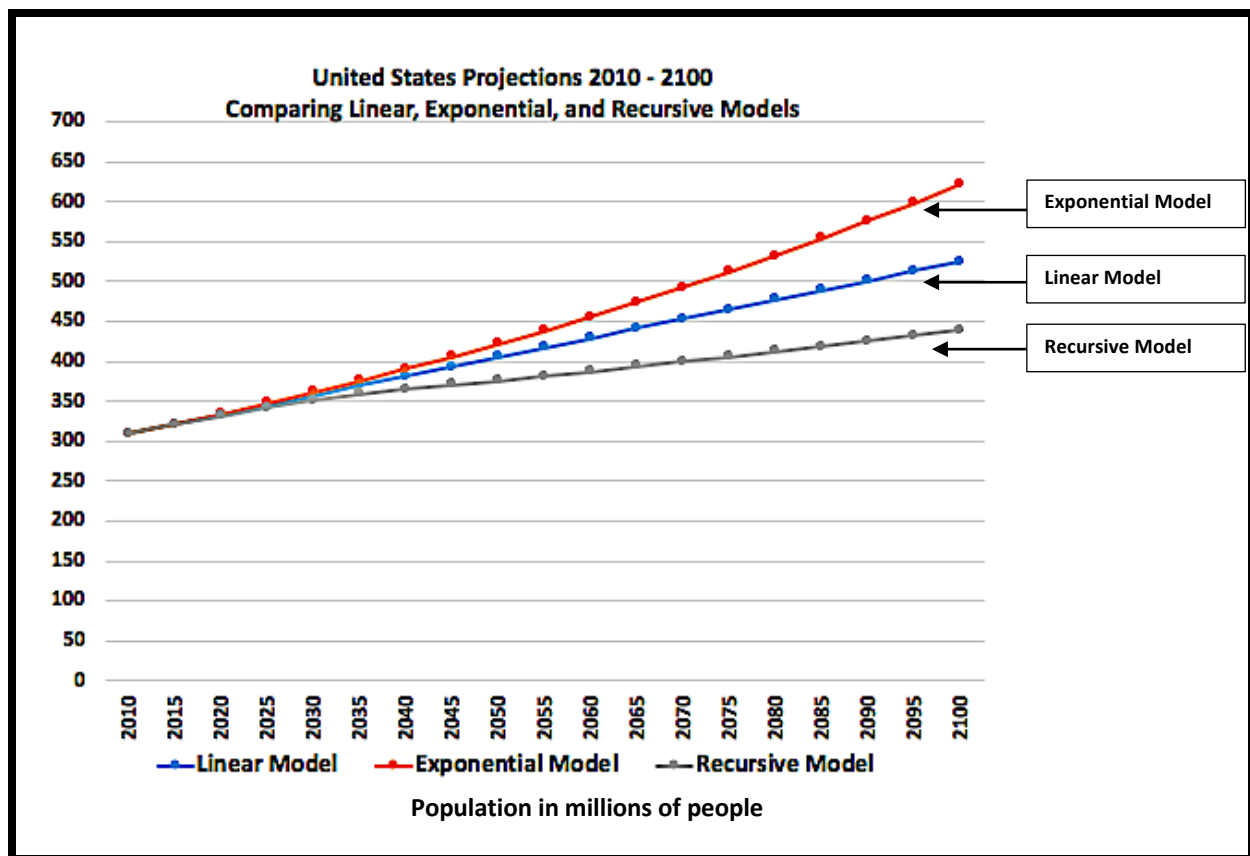
accumulates money by encouraging people to save their money in their bank. Interest is paid to people who save their money with the bank. Saving money and then borrowing money results in economic activity that is linked to a nation's overall economy. The United States has a higher percentage of its population who buy a house than most other countries. The percentage of people who rent rather than own a home is higher in several European countries. Disruption in a country's economy often results when a particular element of the economy, such as home ownership, is impacted by change.

2. If the age groups in 2050 who are under 40 years old generally do not buy a house, do you think the effect on the country's economy would be significant? Why or why not?

3. What products or services might be considered important in 2050 based on the population distribution?

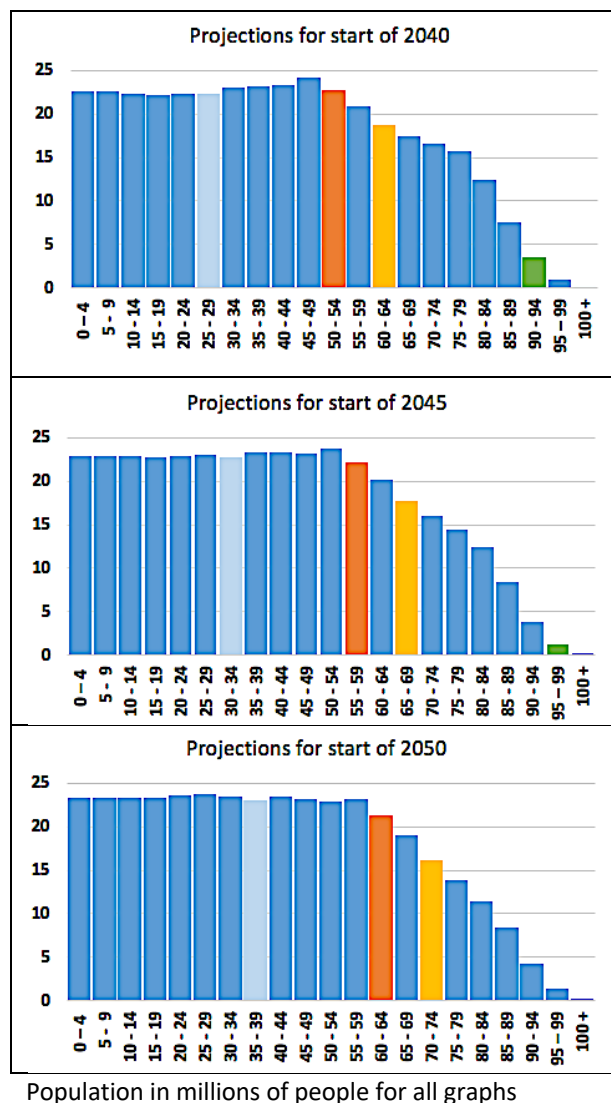
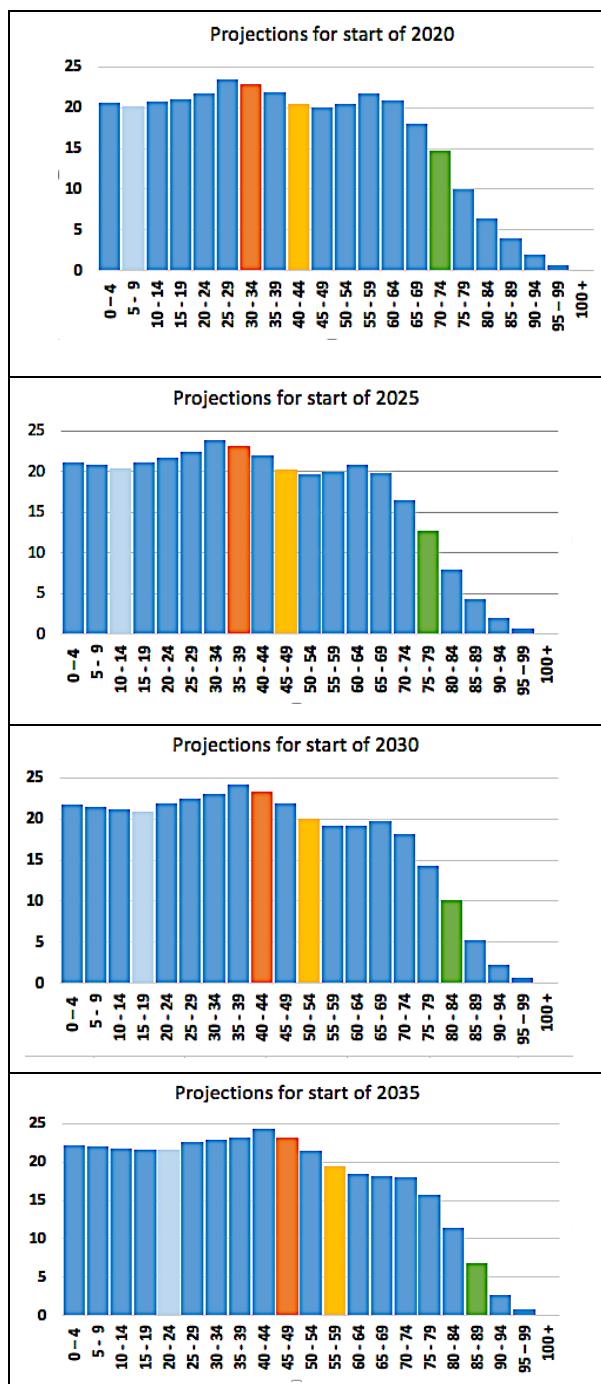
The projection models presented in this module were based on an arithmetic sequence or linear model, a geometric sequence or an exponential model, and a recursive model. The arithmetic sequence was derived by adding a constant to each previous population estimate. The geometric sequence was derived by multiplying a constant factor to each previous population estimate. The arithmetic sequence resulted in a linear model, and the geometric sequence resulted in an exponential model. The recursive model was derived by multiplying a constant list of factors (or population factors) to connected age groups and a constant foundation factor.

Examine the following graph that compares the estimates of the country's population from 2010 to 2100 for each of these models:



4. The population projections for 5-year intervals are plotted for each of the models from 2010 to 2100. Answer the following:
 - a. Which model would result in the greatest change in the total population from 2010 to 2100? Explain your answer.
 - b. Which model would result in the least change in the total population from 2010 to 2100? Explain your answer.

The recursive model, like the linear and exponential models, provides a projection of the total population of the country for each 5-year interval. In addition, the recursive model also provides estimates of changes in the shape of the country as visible in histograms by age groups. Examine the following histograms of the country's age groups from 2010 to 2050 based on the recursive model. Note the projections for the age groups that include Adeline, Abbey, Kristin, and her parents as your work through the problems.

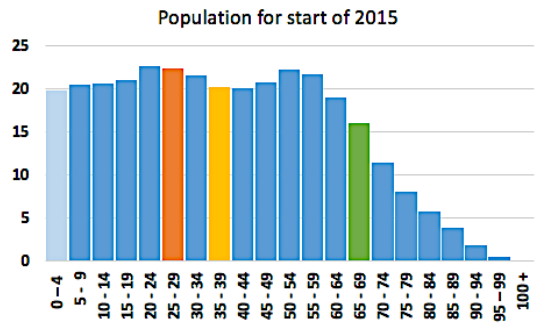

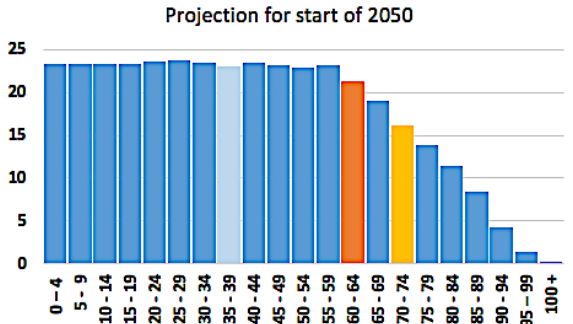


5. Answer the following.

- Identify at least 2 summaries of the 2025 graph that indicate it followed the 2020 graph.

- b. Identify at least 2 summaries of the 2030 graph that indicate it followed the 2025 graph.
 - c. In what way is the population distribution as outlined in the histogram for 2035 similar to the population distribution as outlined in the histogram for 2030?
6. Kristin commented that the graphs for 2040, 2045, 2050 begin to look like a rectangle followed by a downward slope at the end.
- a. What summaries of the age groups of the 2050 graph make it look like a rectangle from age groups 0 – 4 years old to 55 – 59 years old?
 - b. What do you think is the reason for the downward slope that begins at 60 – 64 years old?

7. The following graphs provide an overall comparison of the changes of the country and the age groups from the start of 2015 to the start of 2050. The counts of the age groups are based on the counts you completed for **Handout 6**. Calculate the percent of the country's population in each of the age intervals requested for 2015 and 2050:

		
<p>Estimated count of people 0 – 24 years old: 104.78 million people</p> <p>Estimated count of people 25 – 49 years old: 105.29 million people</p> <p>Estimated count of people 50 – 74 years old: 90.63 million people</p> <p>Estimated count of people 75 – 100+ years old: 20.21 million people</p> <p>Estimated total population: 320.91 million people</p>		<p>Projected count of people 0 – 24 years old: 116.72 million people</p> <p>Projected count of people 25 – 49 years old: 116.77 million people</p> <p>Projected count of people 50 – 74 years old: 102.64 million people</p> <p>Projected count of people 75 – 100+ years old: 39.53 million people</p> <p>Projected total population: 375.67 million people</p>
<p>Country's Layers</p> <p>Estimated percent of the country who are 0 – 24 years old:</p> <p>Estimated percent of the country who are 25 – 49 years old:</p> <p>Estimated percent of the country who are 50 – 74 years old:</p> <p>Estimated percent of the country who are 75 – 100+ years old:</p>		<p>Country's Layers</p> <p>Projected percent of the country who are 0 – 24 years old:</p> <p>Projected percent of the country who are 25 – 49 years old:</p> <p>Projected percent of the country who are 50 – 74 years old:</p> <p>Projected percent of the country who are 75 – 100+ years old:</p>

8. Based on the above percent of the layers, describe the country's shape as bottom-layered, lower middle-layered, upper middle-layered, or top-layered for:
 - a. 2015
 - b. 2050
9. Use **Handout 6** to estimate the 5-year age group in which the median age would be located for 2015.
10. Use **Handout 6** to estimate the 5-year age group in which the median age would be located for 2050.
11. Use **Handout 6** to identify the age group that has the greatest projected increase in the count of people when comparing the 2015 to the 2050 counts. What is the percent increase of the 2050 count in this age group to the 2015 count of this age group?
12. Use **Handout 6** to identify the age group that has the greatest projected decrease in the count of people when comparing the 2015 to the 2050 counts if any decreases exist. What is the percent decrease of the 2050 count to the 2015 count of this age group?
13. Identify an age group that is projected to have the greatest percent increase of people when comparing the 2015 to the 2050 counts.

As the recursive model continues, the “sameness” of the age groups in which death is not a major change in the count of people displays the least growth. The population factors in these age groups are not that different, resulting in similar projections. The constant foundation factor also results in the count of births to even out.

What if birth rates change during a 5-year interval? What if immigration or emigration rates change for all age groups? What if there is a major health problem that results in higher number of people who die? What if the economy of the country is strong and results in the need for more workers? What if the economy is not strong, with possibly a depression or recession occurring? Each of these possibilities result in changes in the foundation factor or in the population factors during a 5-year interval. The “raggedness” observed in several of the histograms from 2015 to 2030 are a result of conditions prior to 2015 that resulted in noticeable differences in the population factors and the foundation factor. Unit 4 will consider these possible scenarios, and how the shapes and estimates alter the above projections.