Economics of Superstars

UCLA - Econ 19 - Fall 2018

François Geerolf

Contents

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Econ 19 Material

This website contains the class material for *Economics of Superstars (Econ 19)* I teach at UCLA.

All lectures. Below is an up-to-date version to all lectures and problem sets in pdf format, as well as a beta ebook version of the class.

- All lectures. pdf / epub

Lectures. Below is an html version of all individual lectures, as well as a timetable of the class.

- Oct 2. Lecture 1 - Introduction to the Economics of Superstars
- Oct 16. Lecture 2 - The Statistical Distibution of Superstars: Gaussian VS Pareto
- Oct 30. Lecture 3 - Superstars in Music, Sports and Entertainment
- Nov 13. Lecture 4 - Presentations 1
- Nov 27. Lecture 5 - Presentations 2

Presentations. The presentations will take place during the last two sessions, on November 13 and November 27. Most of the papers are taken from a symposium on "The Top 1 Percent" in the *Journal of Economic Perspectives*. The papers will be presented by groups of 2. Each group should present for about 15 to 20 minutes. We will then have a 5 to 10 minutes classroom discussion on the paper. Your presentations should include at least a summary of the paper, and an overview of the main points. A critical take, as well as your personal thoughts on the paper, are strongly encouraged.

Syllabus

Lectures: Tuesdays 2-3:50 pm. Sessions every two weeks, starting Week 1: Oct 2, Oct 16, Oct 30, Nov 13, Nov 27. Bunche Hall 3170.

Course Website: https://fgeerolf.github.io/econ19/

Moodle Website: https://moodle2.sscnet.ucla.edu/course/view/18F-ECON19-1

Course description. Bradley Cooper, Angelina Jolie, Katy Perry, Tiger Woods, Tim Cook, Marissa Mayer, and all earned more than 10 million dollars last year according to Forbes. That is more than 300 times the median wage in the United States. Can economics make sense of these orders of magnitudes? Who among a famous singer, a CEO running an international organization on several continents, an entrepreneur creating Microsoft, Apple or Facebook, or a successful Wall Street trader, creates more "economic value"? Should inventors, top managers and CEOs be rewarded more than rock stars or professional athletes? What are the arguments for and against counteracting the corresponding increases in inequalities through taxation or other government interventions? Can we expect the rising "winner-takes-all" trend to continue? The Fiat Lux class *Economics of Superstars* should be a playful way to first approach basic economic concepts (optimality, incentives, Pareto distributions, public goods, complementarities, etc..), and to test the power of economic reasoning as well as its limits.

Grading. P/NP basis, based on attendance and 30 mn presentations by groups of 2 or 3, during the last two sessions (Week 7 and Week 9). *To pass this class, you are required to come to all five classes from beginning to end (per university regulation, because our classes are 2-hour classes). Please make sure you can make all five dates before you enroll in this class.*

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- Krueger, Alan B. "The Economics of Real Superstars: The Market for Rock Concerts in the Material World." Journal of Labor Economics 23, no. 1 (January 1, 2005): 1–30.
- Connolly, Marie, and Alan B. Krueger. "Chapter 20 Rockonomics: The Economics of Popular Music." In Handbook of the Economics of Art and Culture, edited by Victor A. Ginsburg and David Throsby, 1:667–719. Elsevier, 2006.
- Malmendier, Ulrike, and Geoffrey Tate. "Superstar CEOs." The Quarterly Journal of Economics 124, no. 4 (November 1, 2009): 1593–1638.

Chapter 1

Introduction to the Economics of Superstars

1.1 Basic Information

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1.2 Some defining features of "Superstar Economics"

During this first course, we start discussing around Sherwin Rosen's *Economics of Superstars* article in *The American Scholar*. Sherwin Rosen (1938-2001) was a great American labor economist, who might have gone on to win the Nobel Memorial Prize in Economic Sciences. Sherwin Rosen's general audience article on *The Economics of Superstars* is very dense and has very much to it, but Sherwin Rosen discusses a number of strong points which we shall come back to.

He argues that markets where superstars are important are characterized by a **number of common features**, which we go through next:

- Superstars can earn extra-ordinary sums.
- The revenues of superstars are very heterogeneous.
- Superstar operate on a scale so large that the market is divided over a handful of participants.

To summarise, markets where superstar economics operate are characterized by large, unequal incomes, which are distributed among a handful of participants. We develop each one of these arguments next.

1.2.1 Large revenues for superstars

Sherwin Rosen's superstar paper was written in 1983, therefore, all the orders of magnitude that he gives need to be adjusted to be comparable to today's numbers. There are two main reasons why his 1.2 million figure for a basketball player on a losing team needs to be adjusted. First, there has been considerable price inflation in the United States since 1983, so that 1.2 million in 1983 could buy much more then than it can buy now. Second, there has been quite a lot of per capita GDP growth as well, so that on average people were much poorer in 1983, which makes the 1.2 million figure even more impressive.

Using the time series of GDP per capita in current U.S. dollars allows to account for both problems at the same time. One may find one such series at the following link: https://db.nomics.world/WB/WDI/NY.GDP.PCAP.CD-US. The data which is then obtained is plotted below. I also give the values for GDP per capita (as well as, for your information, the values for Real GDP per capita, in 2010 dollars).

A simple proportional rule allows us to conclude that in order to convert 1983 dollars to 2017 dollars, taking into account inflation as well as per capita GDP growth, we need to multiply by a factor of 59531.66/15561.43 = 3.83.

Real GDP Per Capita.

year

GDP per capita

Real GDP per capita

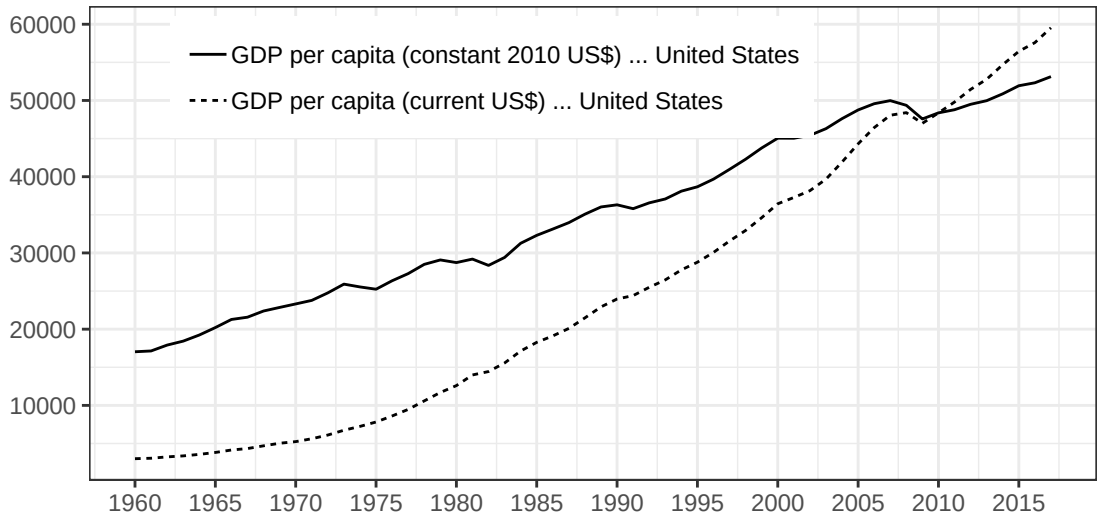


Figure 1.1: Real GDP Per Capita.

1983

15,561

29,406

1990

23,954

36,312

2000

36,450

45,056

2010

48,375

48,375

2017

59,532

53,129

This allows to convert Sherwin Rosen's examples as follows.

Sherwin Rosen (1981)'s examples.

Star

1983 Income

2017 Income

Basketball player on a losing team

800,000

3,060,472

Television interviewer

2,000,000

7,651,181

Typical NBA Player

250,000

956,398

Boxer of championship caliber (Sugar Ray Loonard)

30,000,000

114,767,717

1.2.2 Heterogeneous revenues for superstars

1.2.3 Large scale for superstars

The "scale" that superstars are able to reach is so potentially large that the whole market size is in fact divided over a only a handful of participants in all activities that superstars are engaged in:

> The first thing to be said in this connection is that certain economic activities admit extreme concentration of both personal reward and market size among a handful of participants. Every economic activity supports considerable diversity of talent and significant inequality in the personal distribution of rewards. Activities where superstars are found differ from those in which most of us make our livings by supporting much less diversity and much more inequality, in the distribution of earnings. The bulk of earnings goes to relatively small numbers of practitioners-typically, the few regarded as among the best in their fields.

Sherwin Rosen also notes that industrial firms are typically not allowed to operate at such large scales - because of worries that this would prevent needed competition. Indeed, there are laws against antitrust, which are supposed to constrain firms in their ability to raises prices, which might be detrimental for consumers. However, no such restrictions exist for individuals, who however are often disproportionately dominating the market that they operate in (at a moment in time, there are only a handful of singers who are able to fill in a large stadium):

> Similar distributions of earnings in the industrial sector would ultimately come to the attention of the Federal Trade Commission or the Justice Department, but so far as I know, proceedings in restraint of trade were never brought against Caruso, Babe Ruth, Picasso, or the Beatles.

Because of such scales, many would-be superstars actually never make it to the top. For example, in boxing, while Sugar Ray leonard has retired after a relatively brief carrer with wealth on the order of $30 million, others struggle:

> The median boxer cannot even make a living at the game an difficulty generating more than a few thousand per year. Only hopefuls, including both those with genuine prospects and those have not yet perceived how dim their prospects really are, can sustain interest and commitment in boxing at those earnings.

These superstar phenomena imply that:

> The National Basketball Association has about 250 players; there is probably a lesser number of tournament- quality golfers and tennis players; and there are at most a few dozen highly successful boxers. The number of people attempting to break into the top echelons is larger by many orders of magnitude.

1.2.4 The reward structure is highly nonlinear in measurable talent and ability

Sherwin Rosen notes that where superstars are found, the scale of rewards appears to rise more than proportionately with talent and ability.

> These examples point to another characteristic of the activities where superstars are found. Rewards and the probability of success appear to rise more than proportionately with talent and ability. In this we are on a little dangerous ground because in many instances it is difficult to find objective measures of personal productivity.

Here, Sherwin Rosen is trying to get at an objective measure of different abilities. He notes that abilities are actually not that different, and that a small different can matter a ton. He takes two examples. First, football:

> If in football a running back is half a step quicker than the defense, that might have enormous effect on his productivity.

Second, golf:

> The top five money winners on the pro golf tour have annual stroke averages that are less than 5 percent lower than the fiftieth or sixtieth ranking players, yet they earn four or five times as much money.

Finally, baseball:

> A twenty-game winning pitcher in baseball earns far more than the sum of two ten-game winners.

This is true in music, as well:

> Interestingly, income differences between first-rank and second-rank performers are substantial, even though, in a blind hearing, an infinitesimal portion of the audience could detect more than minor differences among them.

1.2.5 Use of audiences / Media audiences

Media attention is paramount:

> For the phenomenon of superstar income to exist, certain conditions must exist alongside it. The attention of the media to t he activities in which the superstars engage is one such condition. This becomes evident in the world of show business, of which professional sports might be considered a subset; but it is also evident in arts and letters, two other fields that produce superstars. Show business first. Plausibly informed opinion has it that the number of full-time comedians in the United States does not exceed a few hundred. This is probably a smaller number than was employed in the days of vaudeville. Among contemporary comedians, the most popular are reported to earn extraordinary sums-an d none earn more than those who appear regularly on television. Again, the capacity of television to produce large incomes is manifest in the enormous salaries paid to news broadcasters, especially those who work for t he networks and for stations located in large local markets such as New York and Chicago.
>
> The other element has to do with certain peculiarities in the technology of the production of services through the use of audiences. These activities must admit duplication of a kind so that a person - the superstar - can deliver services to many buyers simultaneously. Once again, here the use of media is instrumental.

1.2.6 Poor talent is an inedequate substitute for superior talent

> Wherever superstars are to be found, I believe at least one of two elements will also be found-elements that are necessary to support and sustain both stars and superstars. One element is

> that the technology of consumption or use of the services provided by the activity must be such that poor talent is an inadequate substitute for superior talent
>
> Sometimes these differences are inherent in the valuations put upon services by buyers. If one surgeon is 10 percent more successful in saving lives than another, who among us would not be willing to pay much more than a 10 percent premium to have the more skillful person perform the operation? A company engaged in a $30 million treble-damages lawsuit is rash to scrimp on the legal talent it engages. Stockholders and directors would look askance at ring mediocre talents under those circumstances.

In the case of the music industry:

> Hearing a succession of second- rate singers does not measure up to hearing one outstanding performance by Placido Domingo. Contracting for a legal defense with two lawyers, each of whom would be likely to lose the case half the time, would not elevate the probability of winning much above one-half and may actually decrease it.

1.2.7 Limited costs of duplication

> The superstar is someone whose audience is enormous relative to the scale on which most of us operate. Personal markets of that magnitude are almost exclusively sustained by use of media as a cooperating resource. These markets represent technologies that, in effect, allow a person to clone himself at little cost. More precisely, costs do not increase nearly in proportion to market size; and if costs are the same, the more tickets that can be sold is, as they say, all gravy. Once an author delivers a manuscript to a publisher, it can be duplicated at small expense practically indefinitely. A television or radio program is communicated virtually costlessly and identically to whomever happens to tune in. The performer or author puts out more or less the same effort whether one thousand or one million people show up to listen to the concert or buy the book.
>
> Most economic activities are far more constrained in this respect. In the generality of such activities, costs increase more nearly in proportion, or more than in proportion, with output. When this is the case, it is not necessarily advantageous to work on the grand scale. The ultimate constraint here is the limitation of time.

For example, a fancy and nimble dentist might manage to keep himself fully occupied by shifting waiting time to patients, by keeping the waiting room full of patients, and by working three chairs sequentially with several assistants. Many patients remain willing to pay the time and money costs if the services provided are sufficiently good, but imagine what would happen to the concentration of supply of dental services if a practitioner could serve a thousand patients simultaneously.

Because of these limited costs of duplication, we can go a long way:

> Here it becomes clear that technologies that enable sellers to cater to mass audiences account for the small number of successful practitioners in the fields we commonly associate with superstars. It just doesn't take many people to supply the entire market demand for these services when each one can effectively duplicate himself through the media. This, combined with a little market competition, also accounts for why the successful few are among the talent elite and why their incomes are so large. In such economic activities, a person of lesser talent is dominated by a person of greater talent who charges the same price. The greater talent captures all the business, and it is worthwhile to get as much business as possible because costs don't increase by very much. But the more talented person can do even better. His extra margin of talent allows him to raise prices above what the less talented can charge without losing significant audience and market share. Once again a little extra ability goes a long way. The return on each unit sold may be very small, but total reward is enormous because unit reward is multiplied by a large number. The fundamental limitation on the superstar's reward is t he potential size of the market out there to be attracted and the relative edge of the superstar's talent over those of others waiting

in the wings - those who are willing to supply services to the market should the occasion arise and who keep trying to do so.

Changes in the technology of communication and control of distribution have decreased the cost of cloning of talent in many areas and contributed substantially to turning mere stars into superstars. Motion pictures, radio, television, phono-reproduction equipment, and other changes in communications not only have generally decreased the real price of entertainment services but also have increased the possible size of each performer's audience. The effect of radio and recordings on pop singers' incomes and the influence of television on the incomes of news reporters and professional athletes are good cases in point. There are finer gradations within these categories. Television is a more effective medium for American football than for bowling, and incomes reflect it. Television nevertheless has had an enormous influence oil the fortunes of top bowlers, golfers, and tennis players because it has enabled their markets to become much larger. Nor are these changes confined to the entertainment sector. Reductions in the costs of communication and transportation have expanded potential markets for all kinds of professional services and have allowed many of the top practitioners in the arts, journalism, and elsewhere to work on national and international scales.

1.2.8 Non-routiness

Some tasks can be performed by just anybody. Others cannot:

Some tasks are so routine and so circumscribed by existing practice that nearly any competent person achieves about the same outcome. Others are more difficult, more uncertain, and, this being so, allow greater possibilities for alternative courses of action and decision. Such tasks offer greater scope for superior talent to stand out and make its mark. More capable physicians spend smaller fractions of their time on routine cases and larger fractions on difficult ones than do physicians of more modest ability, and it is socially desirable that they should do so. Untested apprentice jockeys never ride the favorites in big- stakes races.

1.3 Questions raised

Sherwin Rosen then raises a few questions which are very relevant for thinking about the economics of superstars.

1.3.1 Why is paid not proportional to the number of hours supplied?

A key feature of the economics of superstars is that unlike in most economic activities, where it looks like every individual is paid in proportion to the number of hours he puts in, superstars seem to earn income without a proportional effort. In these markets, the most successful earn a disproportionate amount, compared to others who struggle.

A salesman's productivity is easily measured by the value of goods he sells relative to their cost. Payment on commission basis guarantees a roughly proportional relationship between personal productivity and pay (roughly, because most commission systems are not strictly linear). If the nature of competition was such that the person who sold the most in the firm received, say, 80 percent of the firm's total compensation to salespersons, the distribution of reward would be much more concentrated and skewed to the top ranks than it actually is. But, then, this is precisely what defines a superstar.

1.3.2 Are these levels of income "efficient"?

Sherwin Rosen argues that the compensation of superstars can nevertheless be considered "efficient".

> In a competitive market economy, of which the United States is a tolerable approximation for the purposes of this discussion, competition ensures that workers are paid in proportion to their personal contribution to national output. Were someone paid less than that contribution, a competing firm would bid more for his services. A person perceived as twice as productive receives twice as much. By the standards of the day, this kind of social arrangement is generally thought to be reasonably equitable.

We will investigate more in detail what exactly Sherwin Rosen here means when he says "efficient". What Sherwin Rosen refers to here is the First Welfare Theorem. This First Welfare Theorem is a confirmation of Adam Smith's invisible hand: competitive markets tend towards an *efficient allocation of resources*. By efficient, economists mean here that it is impossible to make any individual better off without making at least one individual worse off. This criterion for efficiency is called *Pareto efficiency*.

> In addition, a central theorem in economics proves that payment by appropriate contribution is the efficient outcome of a decentralized competitive market mechanism under ordinary circumstances. It is efficient in the sense of making the best out of resources available. To be sure, most of us perceive our own talent with a bit acuity than the way others see it, but misperceptions on that score are, with a few exceptions, ones we can live with. Superstar phenomena appear on the surface to be rather different. There a person with edge in talent receives significantly larger rewards. The puzzle is confounded by the fact that the activities in which superstars engage are characterized by an extreme form of competition. Does this suggest that the principle of payment by contribution has been abandoned.

1.3.3 What explains box office appeal?

Sherwin Rosen is very honest about the limits of economics, which can't explain what explains success.

> Here the elusive quality of box-office appeal, or the ability to attract an audience and generate a large volume of transactions, must be confronted. Current and prospective impresarios will find no guidance from economists on what makes for box-office appeal. One might as well consult psychiatrists on how to raise children.

However, some things can still be said of which industries are more prone to seeing superstars, as well as explain why success often lead to more success.

> But that doesn't mean people can't recognize it when they see it, or that where and when superstars will appear, and to what extent, might not be predictable, even though it is impossible to tell in advance who the lucky ones will be. The general importance of box-office appeal in the creation of superstars should not be underestimated. The jockeys who obtain mounts in the big races need the credential of a winning record. Aspiring, executives cater to a small clientele but still need to attract sufficient attention by past performances to be in the running for the top positions.

Additional Readings

Zuckerman, Laurence. "Sherwin Rosen, 62, Economist Who Focused on Labor Matters." *The New York Times*, March 28, 2001.

"Sherwin Rosen, Distinguished Service Professor in Economics, dies at 62", *The University of Chicago Chronicle*, March 29, 2001

Chapter 2

The Statistical Distibution of Superstars: Gaussian VS Pareto

During this course, we shall try to understand a technical passage in Sherwin Rosen's *The American Scholar* piece:

> Of particular interest here is an observation, first studied systematically by the great Italian economist Vilfredo Pareto in the late nineteenth century, that the distribution of income contains an **unusually large proportion of top earners**: that is, among the rich rather than the poor. A visual image will perhaps clarify what is meant by "unusual" in this connection. Imagine a graph plotting IQ scores on the horizontal and the frequency of scores on the vertical. The result is a familiar bell-shaped curve. The peak of the bell occurs at a score arbitrarily scaled at 100 and the curve falls symmetrically on either side of 100. Now picture a similar graph, except with earnings on the horizontal. The resulting curve is unbalanced and nonsymmetrical - a bell that is definitely out of whack. To the left of the modal (peak) value it appears much like the IQ frequency curve. However, to the right of the mode it does not fall as fast as it does to the left. It looks as if someone had stood at the right end of the curve, placed it over his back like a rope, and dragged and stretched it out a very long distance. **The upper or right-hand tail of the distribution of income is much thicker** than the lower, left-hand tail. The extra weight on the right lends a certain skewness to the distribution of income. **What this comes down to is that the distribution of earnings is far from proportionate to the distribution of ability.** Amazingly, Pareto's observations have been qualitatively duplicated in virtually every era of every society for which data on income distributions can be found.

In this passage, Sherwin Rosen draws a sharp distribution between Gaussian distributions on the one hand (characterized by the well known bell-shaped curve) and Pareto distributions on the other hand:

1. "Imagine a graph plotting IQ scores on the horizontal and the frequency of scores on the vertical. The result is a familiar Bell-shaped curve."

2. "The upper or right-hand tail of the distribution of income is much thicker than the lower, left-hand tail. The extra weight on the right lends a certain skewness to the distribution of income. What this comes down to is that the distribution of earnings is far from proportionate to the distribution of ability."

We first investigate the mathematics of these different distributions, before proceeding to describing some real-world statistical distributions, and connect them to Bell-shaped curves on the one hand and Pareto distributions on the other hand.

2.1 Mathematics of Statistical Distributions

In order to understand Sherwin Rosen's above comment, I need to take you through some mathematics. Do not panic ! I am going to take you through everything, and a prerequisite of mathematics from high school should be sufficient.

2.1.1 Bell-Shaped Distributions

The Bell shape curve is defined by a density function given by:

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{(x-\mu)^2}{\sigma^2}\right).$$

One implication is that the density of a Bell Shaped curve goes very rapidly to zero as x goes to infinity. When premultiplied by any power function x^a, no matter how large a, the density of a Bell-shaped curve still converges to zero, which means that the density is negligible compared to any power function when x to infinity:

$$\text{for all } a > 0, \quad \lim_{x \to +\infty} x^a f(x) = 0.$$

Intuitively, this means that the Gaussian Distribution goes "very fast" to zero as x becomes large, faster in fact than usual functions which are thought to go very fast to zero (thing, for example of x^10000 when x becomes large).

Here is a link to the Google Sheets that we created in order to look at the Gaussian distribution. In particular, we were able to plot the density function of a Normal Distribution with $\mu = 0$ and $\sigma = 1$, using the formula above. Note: this Google Sheet is read only. However, you may copy and paste from this Google Sheet, and choose your own values for μ and σ.

2.1.2 Pareto Distributions

A key feature of the Pareto distribution is that the density distribution does not go as fast to 0 as with the Gaussian Distribution, as x becomes large.

In the context For concreteness, if x is population, then this would mean that there are relatively many cities with a large size, especially when assessed against the average city size, as well as its standard deviation. Similarly, there are relatively many incomes that are much larger than the mean. The Pareto Distribution is in fact defined by:

$$f(x) = a\frac{x_m^a}{x^{a+1}}.$$

For the cumulative distribution function, this implies:

$$1 - F(x) = \left(\frac{x_m}{x}\right)^a.$$

2.2 Some Real-Life Distributions

2.2.1 Natural Sciences

Many distributions in the natural sciences are well described by a Bell-shaped curve. In order to illustrate this, let us use the National Longitudinal Surveys (NLS) from the Bureau of Labor Statistics which tracks the income, education, and life circumstances of a large cohort of Americans across several decades. We use `summary` in order to summarise our dataset.

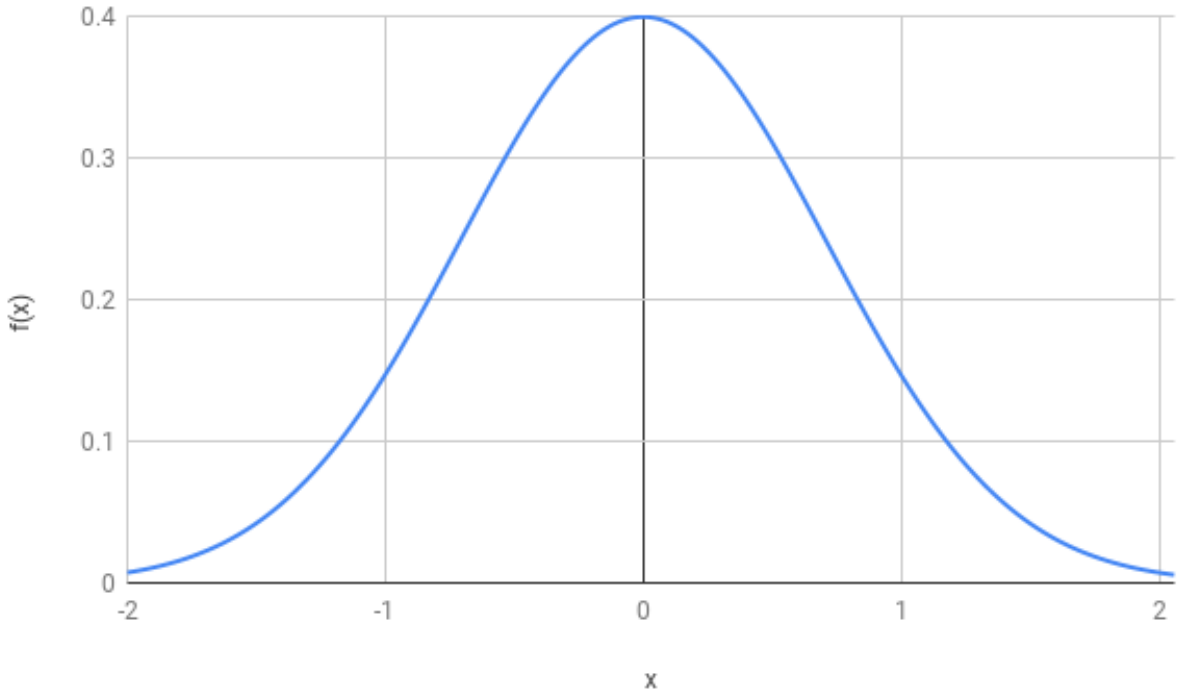
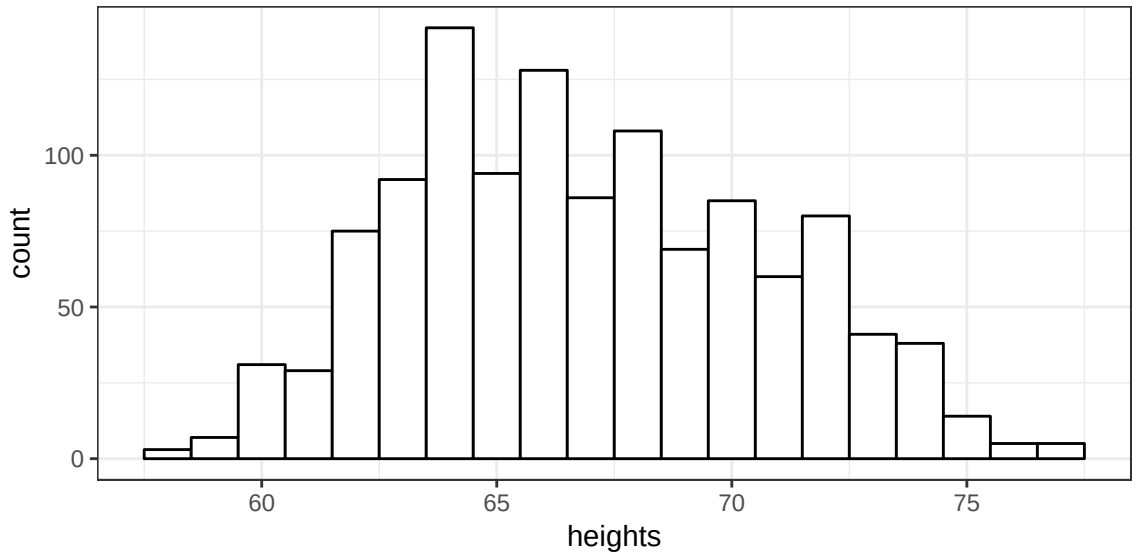
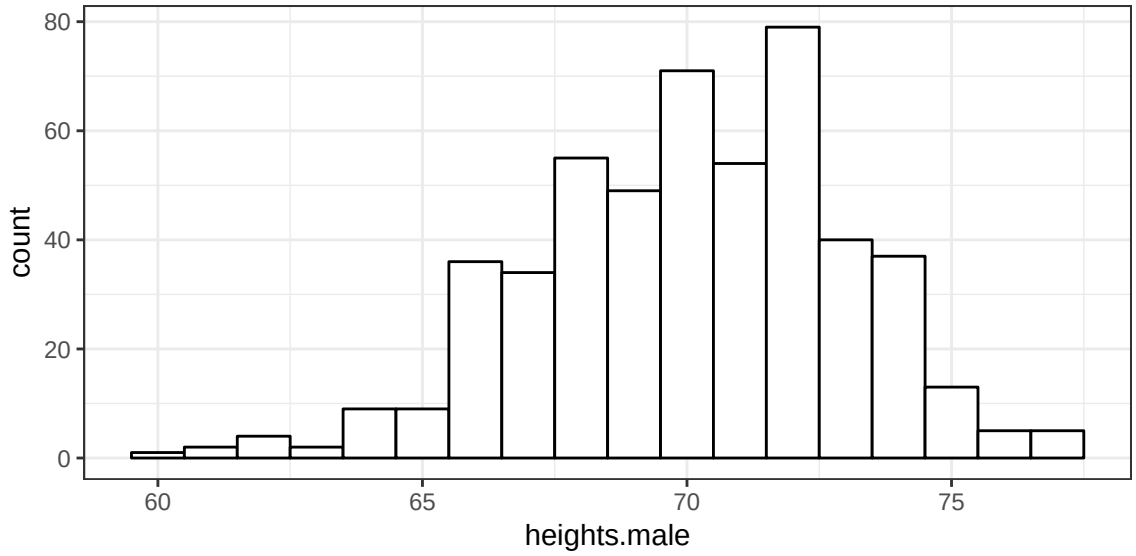


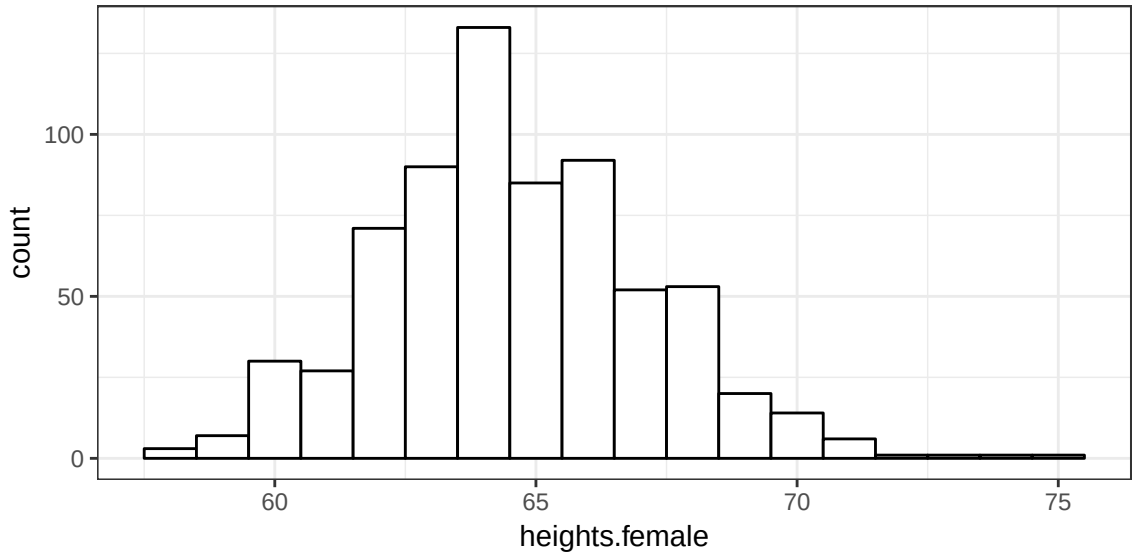
Figure 2.1: Bell Shaped Curve.

```
#       earn             height          sex            ed
#  Min.   :   200   Min.   :57.50   female:687   Min.   : 3.0
#  1st Qu.: 10000   1st Qu.:64.01   male  :505   1st Qu.:12.0
#  Median : 20000   Median :66.45                Median :13.0
#  Mean   : 23155   Mean   :66.92                Mean   :13.5
#  3rd Qu.: 30000   3rd Qu.:69.85                3rd Qu.:16.0
#  Max.   :200000   Max.   :77.05                Max.   :18.0
#       age              race
#  Min.   :18.00   black   :112
#  1st Qu.:29.00   hispanic: 66
#  Median :38.00   other   : 25
#  Mean   :41.38   white   :989
#  3rd Qu.:51.00
#  Max.   :91.00
```

The variable names are pretty self-explanatory. We are in particular interested by the distribution of height, possibly by gender.


count
100
50
0
60
65
70
75
heights


count
80
60
40
20
0
60
65
70
75
heights.male


count
100
50
0
60
65
70
75
heights.female

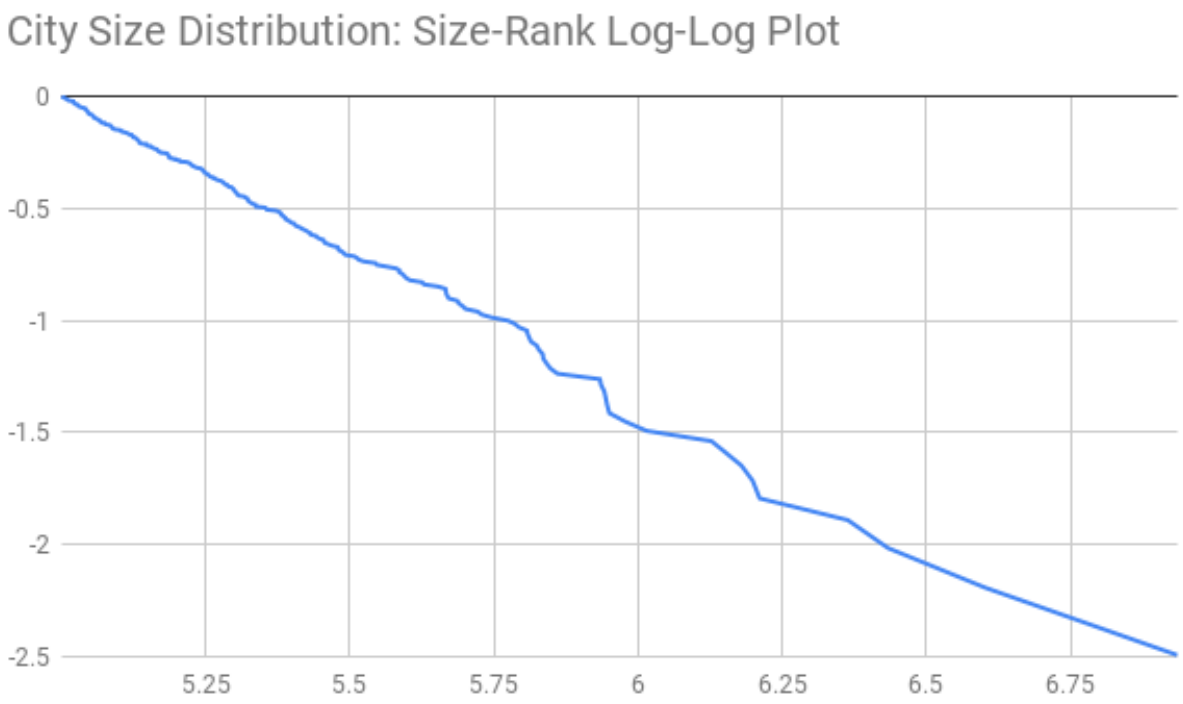


Figure 2.2: City Size Distribution.

2.2.2 Cities

During the class, w have used this Google Spreadsheet in order to plot the city size distribution of cities. We note that the result is something that is close to a linear relationship, when the log rank is plotted against the log size, which shows that the distribution is close to Pareto.

We can also download everything in R directly. The data comes from the following Wikipedia entry: List of United States cities by population.

Biggest cities:

Biggest Cities in the United States.

rank

City

state

pop

1

New York[6]

New York

8,622,698

2

Los Angeles

California

3,999,759

3

Chicago

Illinois

2,716,450

4

Houston[7]

Texas

2,312,717

5

Phoenix

Arizona

1,626,078

6

Philadelphia[8]

Pennsylvania

1,580,863

7

San Antonio

Texas

1,511,946

8

San Diego

California

1,419,516

9

Dallas

Texas

1,341,075

10

San Jose

California

1,035,317

11

Austin

Texas

950,715

12

Jacksonville[9]

Florida

892,062

13

San Francisco[10]

California

884,363

14

Columbus

Ohio

879,170

15

Fort Worth

Texas

874,168

16

Indianapolis[11]

Indiana

863,002

17

Charlotte

North Carolina

859,035

18

Seattle

Washington

724,745

19

Denver[12]

Colorado

704,621

20

Washington[13]

District of Columbia

693,972

21

Boston

Massachusetts

685,094

22

El Paso

Texas

683,577

23

Detroit

Michigan

673,104

24

Nashville[14]

Tennessee

667,560

25

Memphis

Tennessee

652,236

26

Portland

Oregon

647,805

27

Oklahoma City

Oklahoma

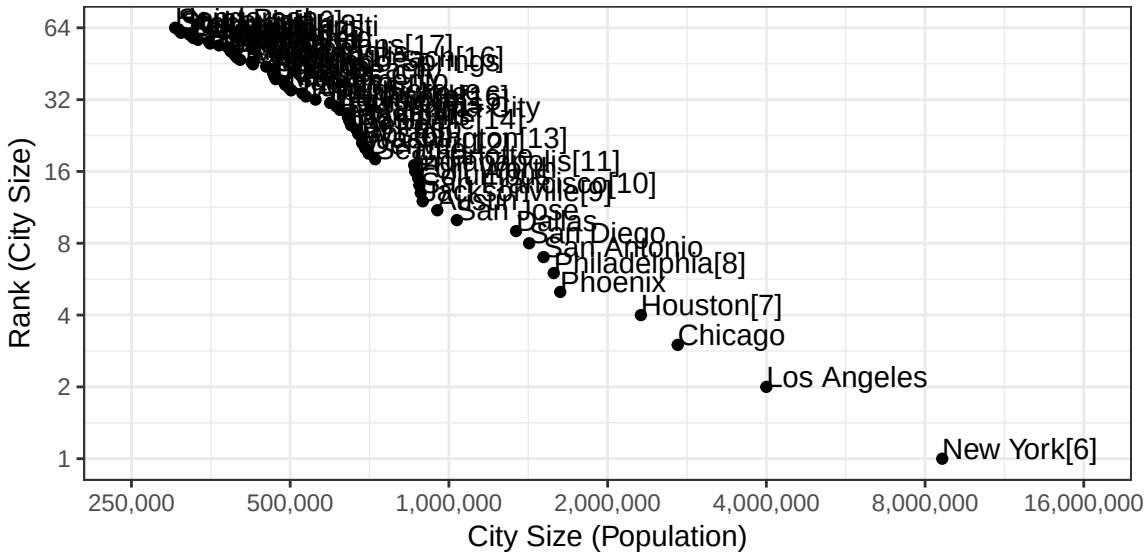
643,648

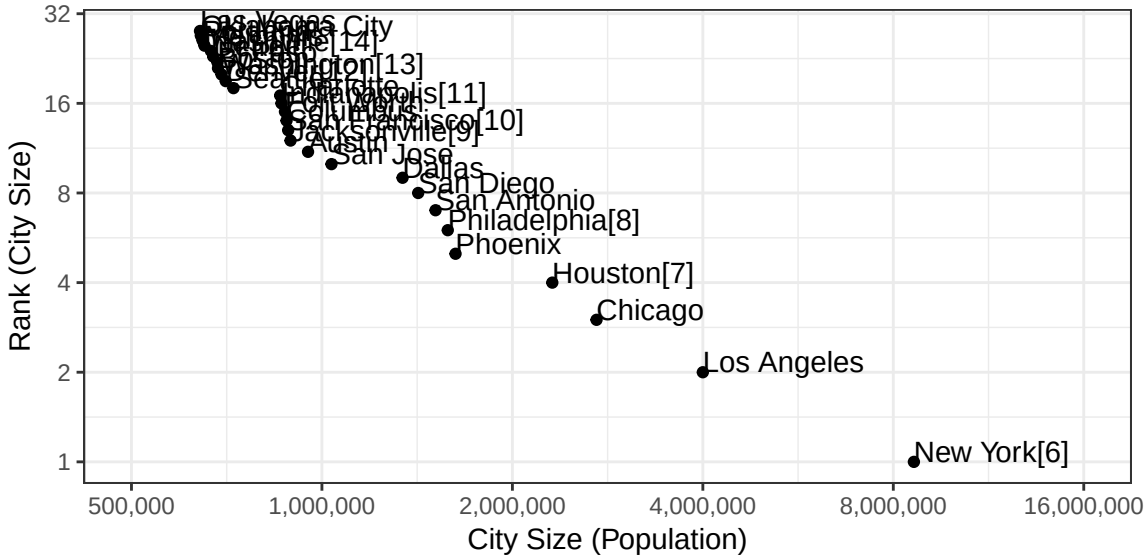
28

Las Vegas

Nevada

641,676





2.2.3 MSAs

Instead of cities, we can look at MSAs instead. The data comes from the following Wikipedia entry: List of metropolitan statistical areas.

The list of the 28 largest Metropolitan Statistical Areas is as follows.

Biggest Metropolitan Statistical Areas (MSAs) in the United States.

Metropolitan statistical area

2010 Census

New York-Newark-Jersey City, NY-NJ-PA MSA

19,567,410

Los Angeles-Long Beach-Anaheim, CA MSA

12,828,837

Chicago-Naperville-Elgin, IL-IN-WI MSA

9,461,105

Dallas-Fort Worth-Arlington, TX MSA

6,426,214

Houston-The Woodlands-Sugar Land, TX MSA

5,920,416

Washington-Arlington-Alexandria, DC-VA-MD-WV MSA

5,636,232

Miami-Fort Lauderdale-West Palm Beach, FL MSA

5,564,635

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA

5,965,343

Atlanta-Sandy Springs-Roswell, GA MSA

5,286,728

Boston-Cambridge-Newton, MA-NH MSA

4,552,402

Phoenix-Mesa-Scottsdale, AZ MSA

4,192,887

San Francisco-Oakland-Hayward, CA MSA

4,335,391

Riverside-San Bernardino-Ontario, CA MSA

4,224,851

Detroit-Warren-Dearborn, MI MSA

4,296,250

Seattle-Tacoma-Bellevue, WA MSA

3,439,809

Minneapolis-St. Paul-Bloomington, MN-WI MSA

3,348,859

San Diego-Carlsbad, CA MSA

3,095,313

Tampa-St. Petersburg-Clearwater, FL MSA

2,783,243

Denver-Aurora-Lakewood, CO MSA

2,543,482

Baltimore-Columbia-Towson, MD MSA

2,710,489

St. Louis, MO-IL MSA

2,787,701

Charlotte-Concord-Gastonia, NC-SC MSA

2,217,012

Orlando-Kissimmee-Sanford, FL MSA

2,134,411

San Antonio-New Braunfels, TX MSA

2,142,508

Portland-Vancouver-Hillsboro, OR-WA MSA

2,226,009

Pittsburgh, PA MSA

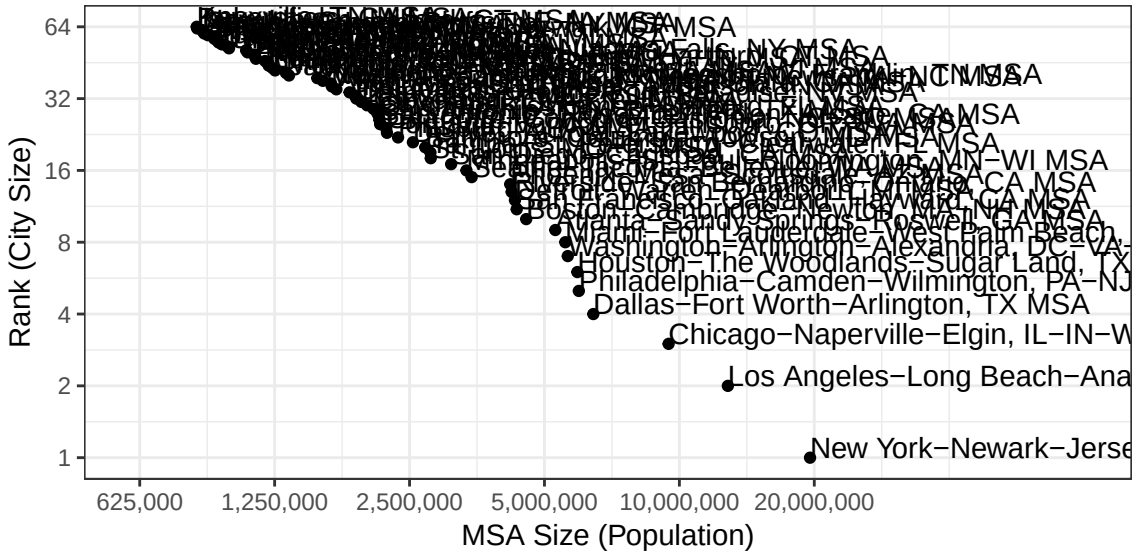
2,356,285

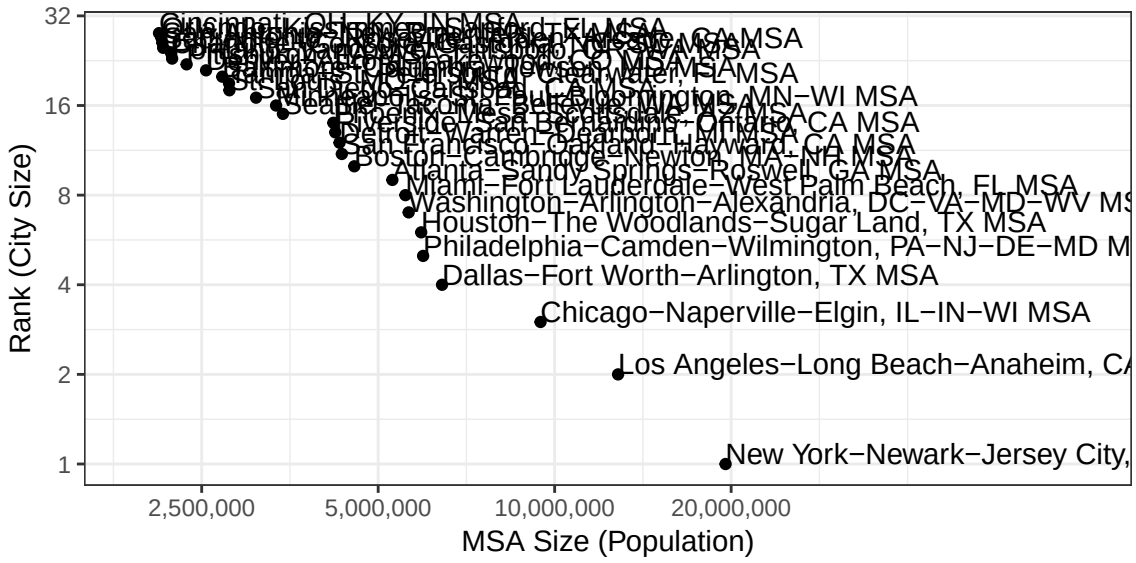
Sacramento–Roseville–Arden-Arcade, CA MSA

2,149,127

Las Vegas-Henderson-Paradise, NV MSA

1,951,269




Rank (City Size)
32
16
8
4
2
1
2,500,000
5,000,000
10,000,000
20,000,000
MSA Size (Population)
Atlanta−Sandy Springs−Roswell, GA MSA
Miami−Fort Lauderdale−West Palm Beach, FL MSA
Houston−The Woodlands−Sugar Land, TX MSA
Dallas−Fort Worth−Arlington, TX MSA
Chicago−Naperville−Elgin, IL−IN−WI MSA
Los Angeles−Long Beach−Anaheim, CA
New York−Newark−Jersey City,

Chapter 3

Superstars in Music, Sports and Entertainment

Sherwin Rosen, in the *American Scholar*, writes:

> Performers of first rank comprise a limited handful out of these small totals and have very large incomes. There are also known to be substantial differences in income between them and those in the second rank, even though most consumers would have difficulty detecting more than minor differences in a "blind" hearing.

What Sherwin Rosen says is that there are very few differences in talents at the very top.

> The elusive quality of "box office appeal," the ability to attract an audience and generate a large volume of transactions, is the issue that must be confronted. Recognition that one's personal market scale is important, in the theory of income distribution has a long history, but the idea has not been developed very extensively in the literature.
>
> Rest assured that prospective impresarios will receive no guidance here on what makes for box office appeal, sometimes said to involve a combination of talent and charisma in uncertain proportions. In the formal model all that is taken for granted and represented by a single factor rather than by two, an index q labeled talent or quality.
>
> Albert Rees is a good introduction to the size distribution of income. The selectivity effects of differential talent and comparative advantage on the skew in income distributions are spelled out in my 1978 article, also see the references there. Melvin Reder's survey touches some of the issues raised here.
>
> Of course social scientists and statisticians have had a long standing fascination with rank-size relationships, as perusal of the many entries in the Encyclopedia of the Social Sciences will attest.

3.1 Statistical Distributions for Superstars

We use the methods we saw in course 2 and plot the log rank on the y axis against the log of the outcome of interest (revenues, number of views, number of sales, etc.) We show that many of these distributions associated to superstar phenomena display a Pareto-like behavior in the tail: this means that there are very many observations which deviate substantially from the mean, and that earnings and success accrue disproportionately to the very top.

3.1.1 Most-downloaded songs in the United Kingdom

The data comes from the following Wikipedia entry: List of most-downloaded songs in the United Kingdom.

List of most downloaded songs in the United Kingdom.

No.

Artist

Song

Copies sold[a]

1

Pharrell Williams

“Happy”

1,922,000[3]

2

Adele

“Someone Like You”

1,637,000+[4]

3

Robin Thicke featuring T.I. and Pharrell Williams

“Blurred Lines”

1,620,000+

4

Maroon 5 featuring Christina Aguilera

“Moves Like Jagger”

1,500,000+

5

Gotye featuring Kimbra

“Somebody That I Used to Know”

1,470,000+

6

Daft Punk featuring Pharrell Williams

“Get Lucky”

1,400,000+

7

The Black Eyed Peas

“I Gotta Feeling”

1,350,000+

8

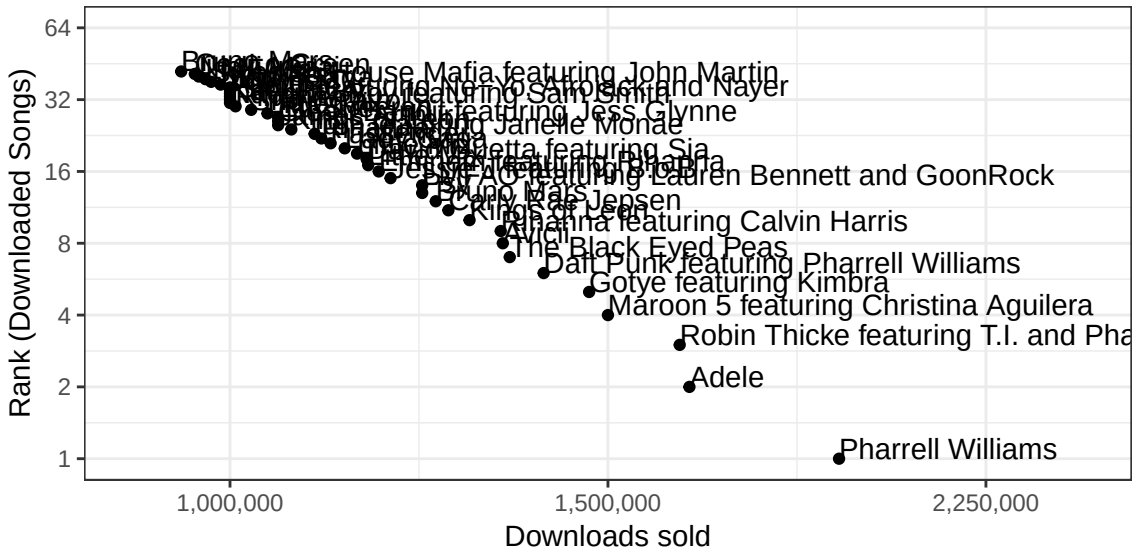


Figure 3.1: List of most downloaded songs in the United Kingdom, Pareto Plot.

Avicii

“Wake Me Up”

1,340,000+

9

Rihanna featuring Calvin Harris

“We Found Love”

1,337,000+

10

Kings of Leon

“Sex on Fire”

1,293,000+

3.1.2 Most-streamed songs on Spotify

The data comes from the following Wikipedia entry: List of most-streamed songs on Spotify.

List of most streamed songs on Spotify.

Rank

song

value

date

1. “Shape of You”

   1,981

   6 January, 2017