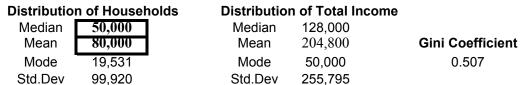
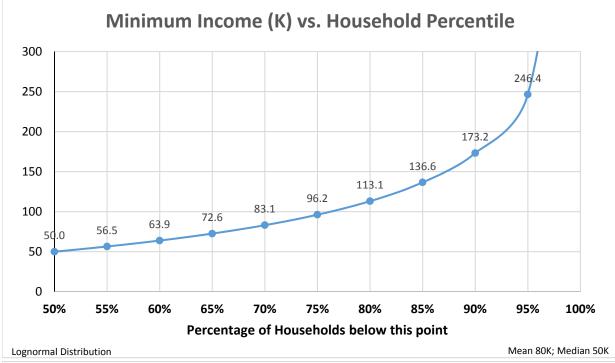
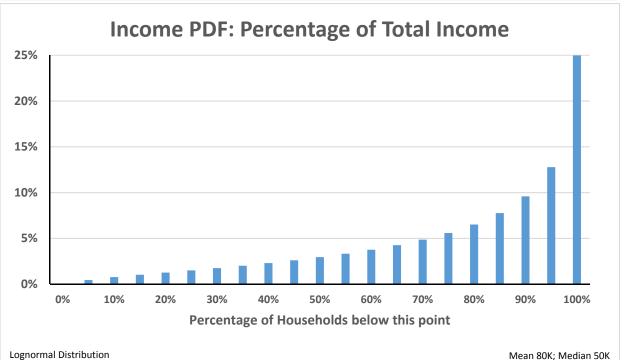
3C 1 2

## Assume Households are distributed log-normally by Income. Enter Mean and Median







Α	В	С	D	Е	F	G	Н	I	52
CDF: "Cum	ulative Distr	ibution Func	tion"		PDF "Prob	ability Distrib	ution Funct	ion"	53
									54
									55
	FROM THE								56
CDF Pctg of		CDF Pctg	Income	Income	Rounded	Income			57
Households			Min / Mean	Mean	Income (K)	•	IncomePD	F	58
0	0.0	0.00%	0.00	80,000	0.0	-80,000			59
5%	10,148	0.4%	0.13	80,000	10.1	-69,852	0.4%		60
10%	14,433	1.2%	0.18	80,000	14.4	-65,567	0.8%		61
15%	18,305	2.2%	0.23	80,000	18.3	-61,695	1.0%		62
20%	22,110	3.5%	0.28	80,000	22.1	-57,890	1.3%		63
25%	26,000	5.0%	0.32	80,000	26.0	-54,000	1.5%		64
30%	30,072	6.8%	0.38	80,000	30.1	-49,928	1.8%		65
35%	34,413	8.8%	0.43	80,000	34.4	-45,587	2.0%		66
40%	39,111	11.1%	0.49	80,000	39.1	-40,889	2.3%		67
45%	44,265	13.7%	0.55	80,000	44.3	-35,735	2.6%		68
50%	50,000	16.6%	0.63	80,000	50.0	-30,000	2.9%		69
55%	56,478	19.9%	0.71	80,000	56.5	-23,522	3.3%		70
60%	63,921	23.7%	0.80	80,000	63.9	-16,079	3.8%		71
65%	72,647	28.0%	0.91	80,000	72.6	-7,353	4.3%		72
70%	83,134	32.8%	1.04	80,000	83.1	3,134	4.9%		73
75%	96,156	38.4%	1.20	80,000	96.2	16,156	5.6%		74
80%	113,070	44.9%	1.41	80,000	113.1	33,070	6.5%		75
85%	136,577	52.7%	1.71	80,000	136.6	56,577	7.8%		76
90%	173,216	62.2%	2.17	80,000	173.2	93,216	9.6%		77
95%	246,355	75.0%	3.08	80,000	246.4	166,355	12.8%		78
100%	611,648	100.0%	7.65	80,000	611.6	531,648	25.0%		79
	•						100.0%	TOTAL	80
Interpretat	ions:								81
C69									82
The bottom 50% of households have 33.2% of their equal share of total income.						83			
	Jokani 3070 or risuspinsius hare 35.270 or their oqual onare or total moome.							84	
68.6% Percentage of households having below-average income.						85			
						86			
·							87		
							88		
· · · · · · · · · · · · · · · · · · ·							89		
· · · · · · · · · · · · · · · · · · ·							90		
							91		
							92		
	· ·								93
									94
31.4%	Percentage	of househo	lds that have	above-ave	erage income	es			95
	31.4% Percentage of households that have above-average incomes 68.6% Percentage of total income that is earned by above-average income households.						96		
	33.575 . Groomago of total moomo that is carried by above average moome households.						97		
									98
									99
									100
Q. If top 1%								101	
•							102		
why is it their minimum income (\$1.07 minion) 4.0 times the mean income (\$60 thousand):									

Α	В	С	D	Е	F	G	Н	103
								104
	FROM THE			Ratio				105
CDF Pctg of		CDF Pctg	CDF	Inc%				106
Households		of Income	XS/TTL	/HH%	1			107
50%	50,000	83.4%	33.4%	1.67				108
45%	56,478	80.1%	35.1%	1.78				109
40%	63,921	76.3%	36.3%	1.91				110
35%	72,647	72.0%	37.0%	2.06				111
30% 25%	83,134	67.2%	37.2%	2.24				112
20%	96,156 113,070	61.6% 55.1%	36.6% 35.1%	2.46 2.75				113
15%	136,577	47.3%	32.3%	3.16				114 115
10%	173,216	37.8%	27.8%	3.78				116
5%	246,355	25.0%	20.0%	4.99				117
2%	366,213	13.9%	11.9%	6.96				117
1%	476,997	8.7%	7.7%	8.74				119
0.5%	607,524	5.4%	4.9%	10.82				120
0.3%	814,452	2.8%	2.6%	14.08				121
0.1%	1,000,371	1.7%	1.6%	16.97				121
0.05%	1,214,781	1.0%	1.0%	20.29				123
0.02%	1,547,313	0.5%	0.5%	25.38				124
0.01%	1,840,435	0.3%	0.3%	29.85				125
0.005%	2,173,527	0.2%	0.2%	34.89				126
0.002%	2,682,187	0.1%	0.1%	42.53				127
0.001%	3,124,420	0.0%	0.0%	49.15				128
	-, , -							129
Interpretat	ions:							130
C119		of househol	ds have 8.7	% of the tota	al income			131
E119	•					of total incom	ne	132
								133
CDF		CDF						134
Top % HH	Min\$	Pctg of XS	Eq-Dist					135
31.4%	80,000	100.0%	100.0%					136
20%	136,577	73.4%	63.7%	1				137
15%	173,216	61.1%	47.8%	1				138
10%	246,355	40.2%	31.9%	1				139
5%	366,213	24.0%	15.9%	1				140
2%	476,997	18.1%	6.4%	1				141
1%	607,524	11.9%	3.2%	1				142
0.1%	1,214,781	2.5%	0.3%					143
0.01%	1,840,435	0.78%	0.0%	1				144
0.001%	3,124,420	0.13%	0.0%	]				145
				_				146
Interpretat	ions:							147
5,726	XS Income	earned by to	p 0.1% if pe	er household	I with below-	ave income		148
1,125	XS Income	earned by to	p 1% if per	household v	vith below-av	/e income		149
								150
29,773	29,773 Average Amount of XS Income per all Households						151	
43,396	· · · · · · · · · · · · · · · · · · ·						152	
94,842	94,842 Average amount of XS Income per household with above-average income 153							153

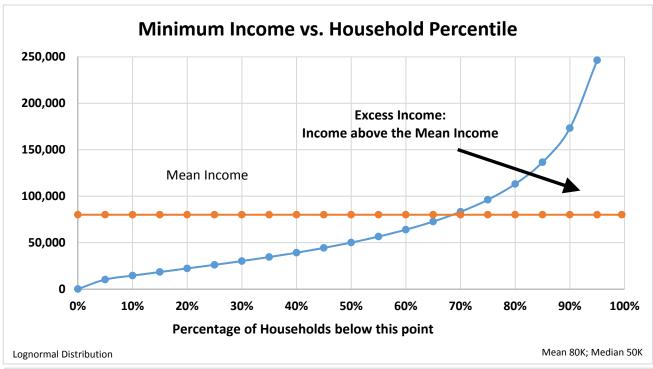
Α	В	С	D	Е	F	G	Н	154
Underlying	, mathemati	cal details (	(Parameters of	f the two Normal dis	tributions)			155
Household	ls: Normal D	Distribution	Tot	tal Incom <u>e: Normal I</u>	Distribution	1		156
	mu	10.820		mu	11.760			157
	mu+S^2/2	11.290		mu+S^2/2	12.230			158
	Sigma^2	0.940		Sigma <sup>2</sup>	0.940			159
	Sigma	0.970		Sigma	0.970			160

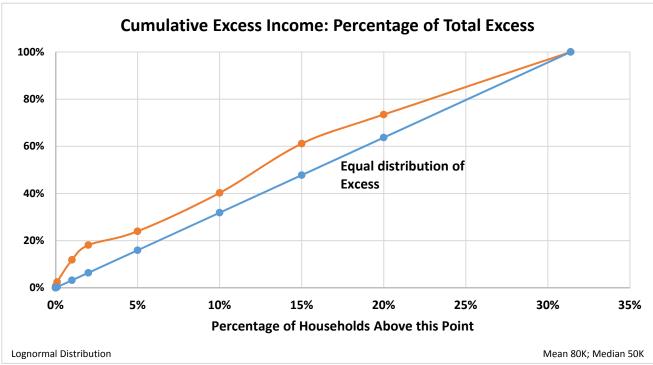
FORMULA	Schield (2014).	Creating the LogNormal Distribution.
C157 =LN(B4)		B60 =LOGNORM.INV(A60,C\$157,C\$160)
C158 =LN(B5)		C60 =LOGNORM.DIST(B60,G\$157,G\$160,1)
C159 =2*(C158-C157)		D60 =B60/B\$5
C160 =SQRT(C159)		
		B109 =LOGNORM.INV(1-A109,C\$157,C\$160)
G157 =C157+C159		C109 =1-LOGNORM.DIST(B109,G\$157,G\$160,1)
G158 =G157+G159/2		D109 =C109-A109
G159 =G160^2		E109 =C109/A109
G160 =C160		
		A95 =1-LOGNORM.DIST(\$B\$5,\$C\$157,\$C\$160,1)
B6 =EXP(C157-C159)		A96 =1-LOGNORM.DIST(\$B\$5,\$G\$157,\$G\$160,1)
, , ,		·
		A92 =A96-A95
E4 =EXP(G157)		
E5 =EXP(G158)		A85 =LOGNORM.DIST(\$B\$5,\$C\$157,\$C\$160,1)
E6 =EXP(G157-G159)		A86 =LOGNORM.DIST(\$B\$5,\$G\$157,\$G\$160,1)
G6 =2*NORM.S.DIST(C16	0/SQRT(2),1	A88 =1-LOGNORM.DIST(\$B\$5,\$C\$157,\$C\$160,1)
,	. ,	A89 =1-LOGNORM.DIST(\$B\$5,\$G\$157,\$G\$160,1)
		D136 =A136/A\$136
B7 =SQRT((EXP(\$C\$159)-	-1)*EXP(2*\$C\$1	57+\$C\$159))
E7 = SQRT((EXP(\$G\$159)	-1)*EXP(2*\$G\$1	57+\$G\$159))
		36)/((1-LOGNORM.DIST(B\$136,G\$157,G\$160,1))-A\$136)
•	. ,,	· · · · · · · · · · · · · · · · · · ·

This worksheet is available at:

> www.StatLit.org/Excel/2014-Schield-Explore-LogNormal-Income-Excel2013.xlsx

For background on Households and Income distributed LogNormally, see
Schield (2014). Exploring the LogNormal Distribution. NNN Workshop. Slides at
> www.StatLit.org/Excel/2014-Schield-Explore-LogNormal-Income-Excel-Slides.pdf





- 68.6% Percentage of households having below-average income.
- 31.4% Share of income by below-average income households.
- 31.4% Percentage of households having above-average incomes.
- 68.6% Share of income by above-average income households.