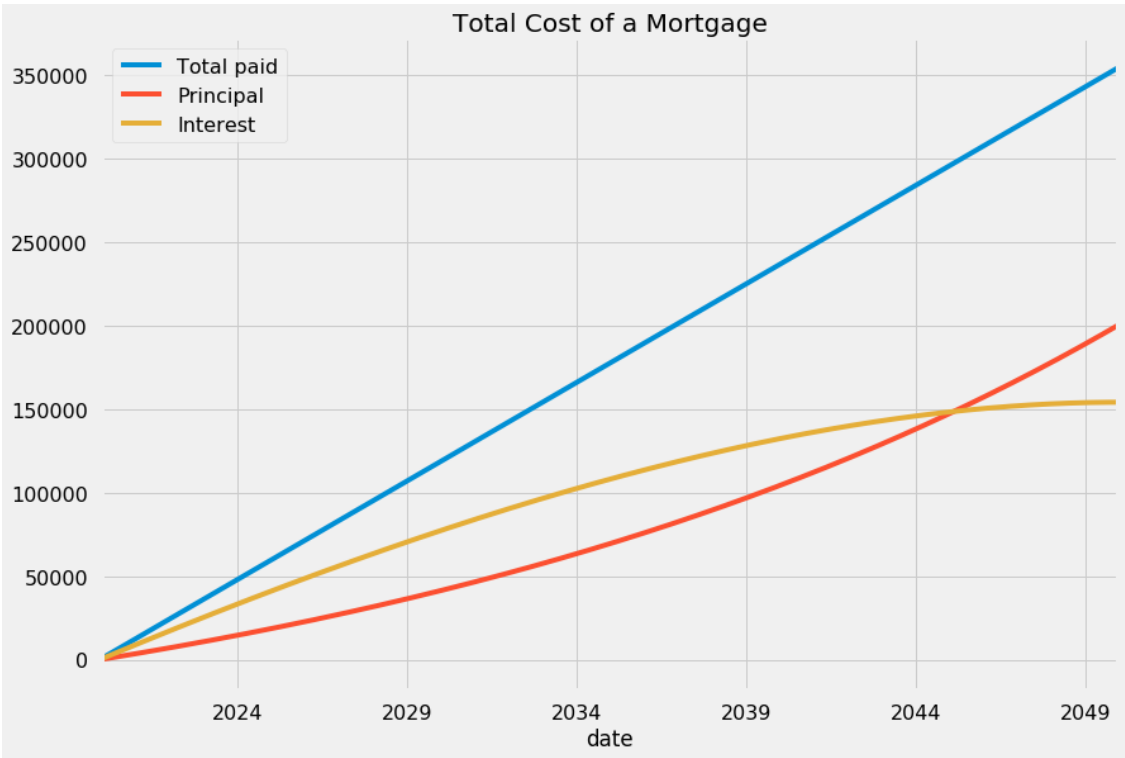


single_home_analysis

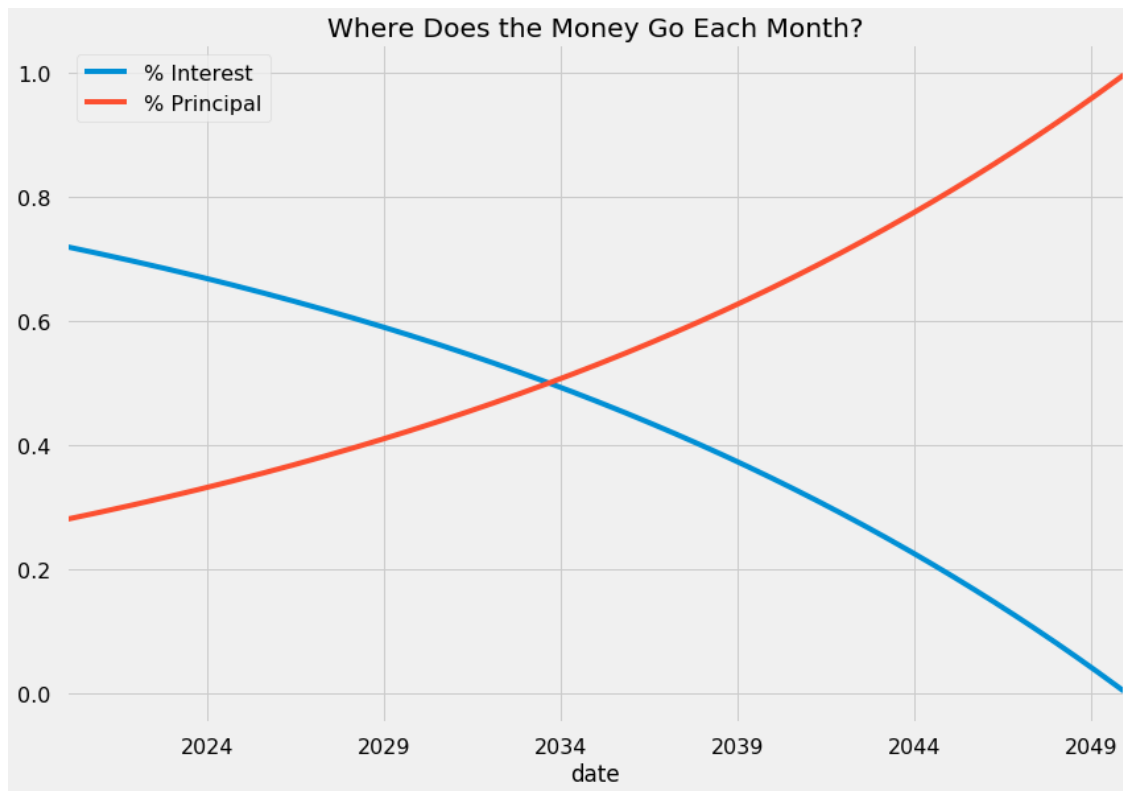
March 29, 2019

1 Mortgage



Out [117]:

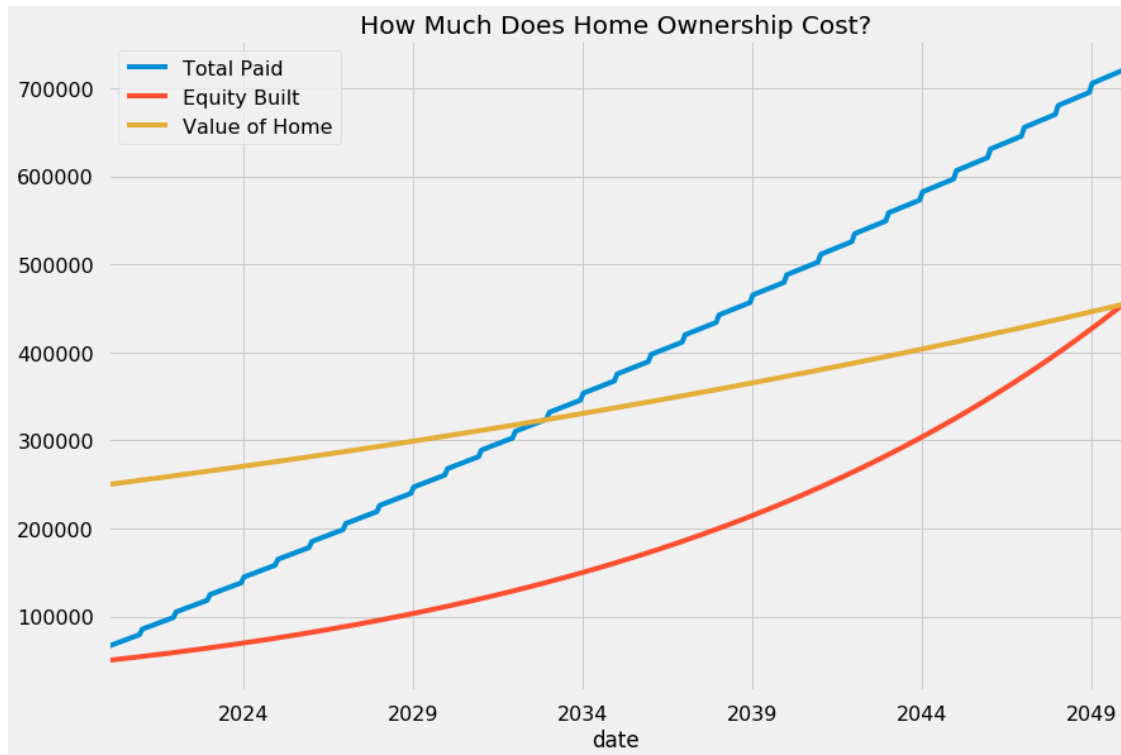
	total_paid	total_principal	total_interest
count	360.000000	360.000000	360.000000
mean	177590.300680	79616.950397	97973.350283
std	102389.698607	57159.576656	46892.555804
min	983.879782	275.546449	708.333333
25%	89287.090231	29431.044299	59856.045932
50%	177590.300680	69473.681927	108116.618752
75%	265893.511128	124468.852239	141424.658890
max	354196.721577	200000.000000	154196.721577



```
Out[119]:
```

	% Interest	% Principal
count	360.000000	360.000000
mean	0.435342	0.564658
std	0.205031	0.205031
min	0.003529	0.280061
25%	0.274459	0.384642
50%	0.471726	0.528274
75%	0.615358	0.725541
max	0.719939	0.996471

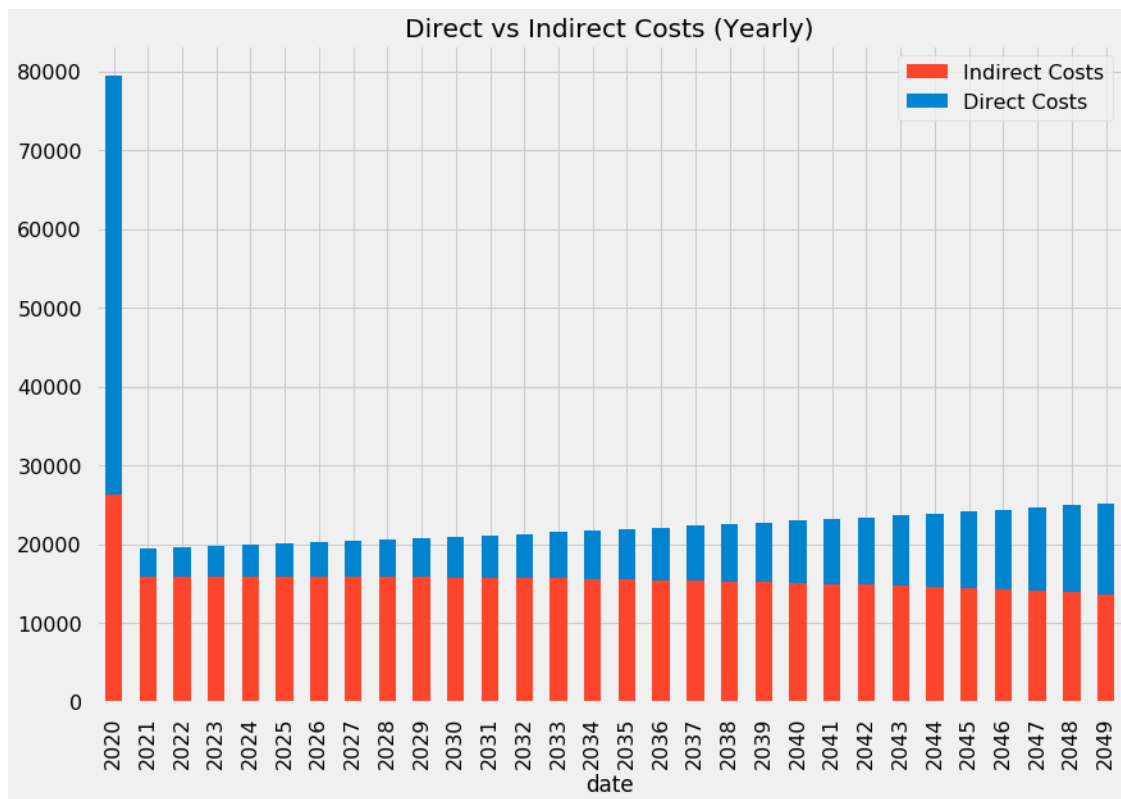
2 Home Ownership



```
Out[124]:
```

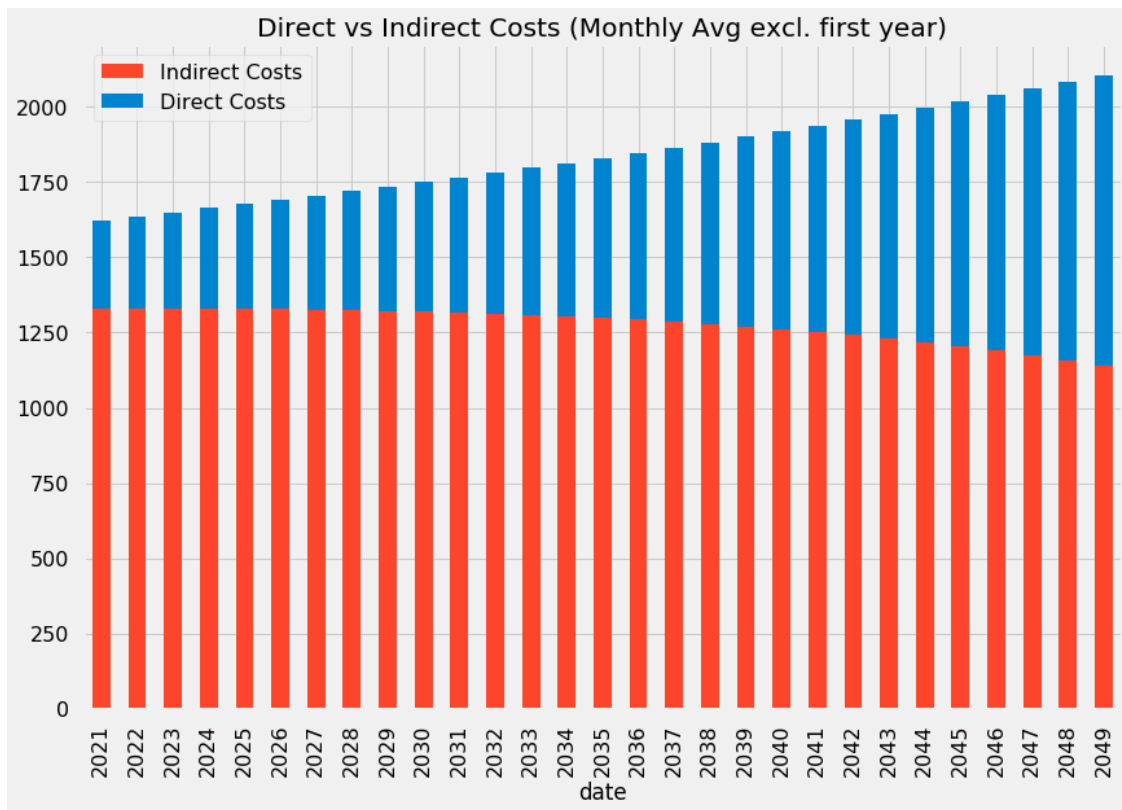
	total	equity	home_value
count	360.000000	360.000000	360.000000
mean	379114.530842	190835.673447	342170.408015
std	191021.153290	114002.884096	59122.144064
min	66333.333333	50275.546449	250000.000000
25%	212763.681530	92235.938682	290301.487974
50%	371518.362936	161098.489016	337099.757301
75%	541616.485502	273178.171916	391442.108926
max	720416.061947	454544.670359	454544.670359

3 Direct vs Indirect Costs



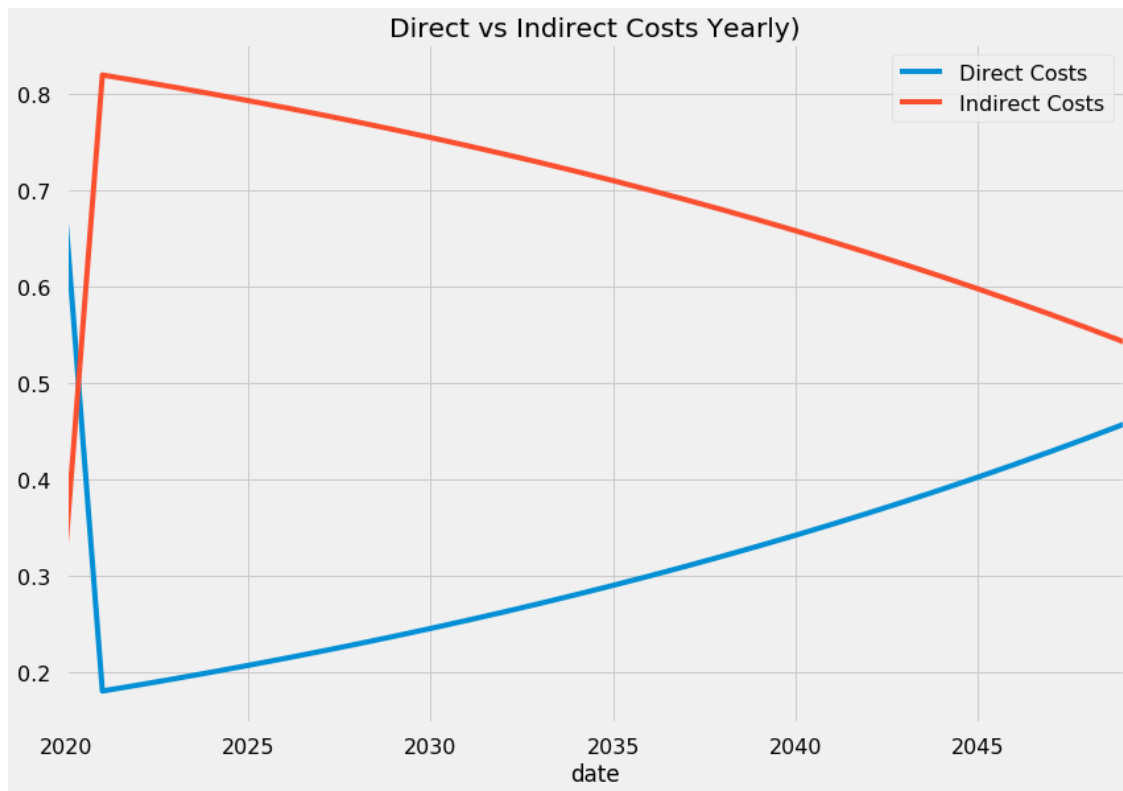
```
Out [127]:
```

	indirect	direct
count	30.000000	30.000000
mean	15689.720280	8324.148452
std	2129.859252	8783.817926
min	13697.324598	3517.856047
25%	14940.300055	4785.556416
50%	15619.678503	6509.339473
75%	15915.995445	8853.042713
max	26374.535667	53096.186397



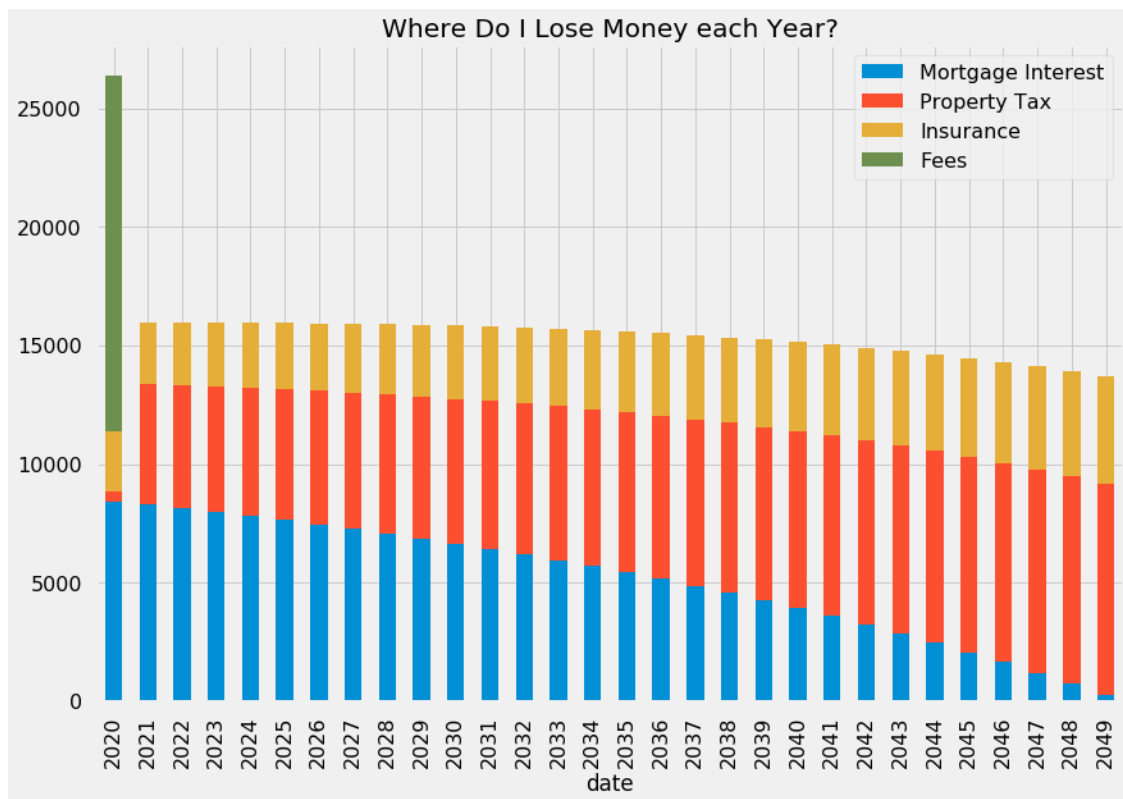
```
Out[129]:
```

	indirect	direct
count	29.000000	29.000000
mean	1276.773197	565.023756
std	57.758002	201.587802
min	1141.443716	293.154671
25%	1242.418091	394.521948
50%	1298.982375	530.940091
75%	1324.957728	714.529017
max	1330.504209	961.599483



```
Out[131]:
```

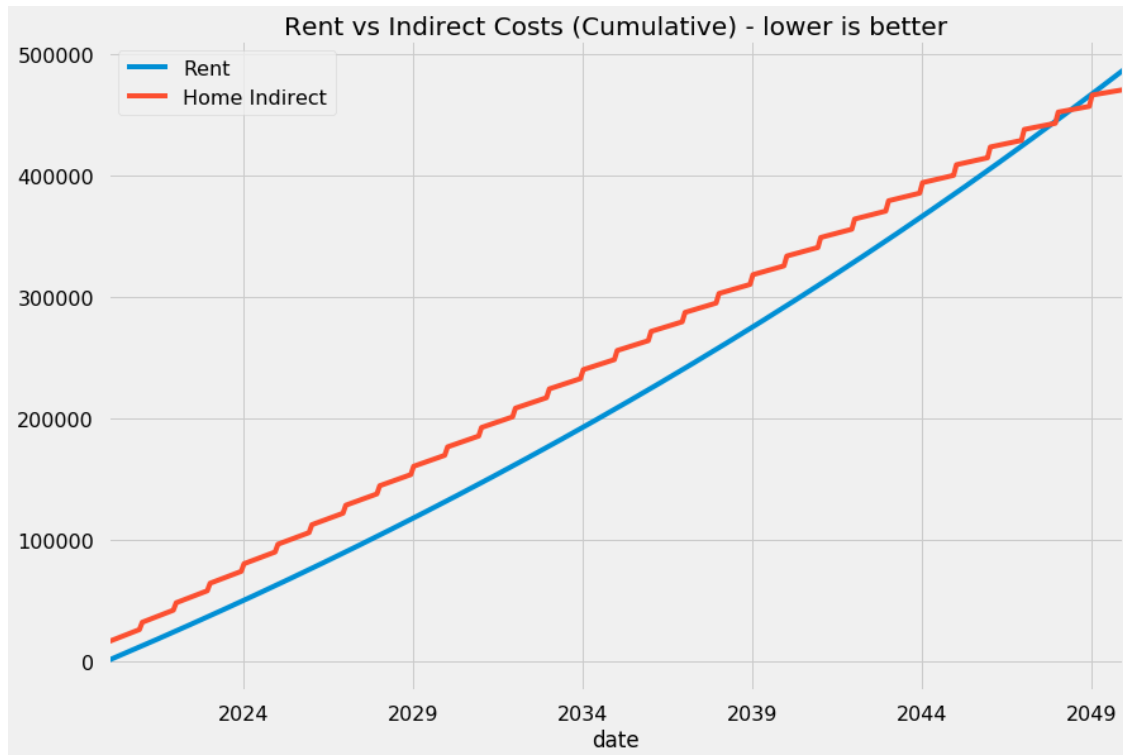
	% Direct	% Indirect
count	30.000000	30.000000
mean	0.312640	0.687360
std	0.106310	0.106310
min	0.180575	0.331877
25%	0.231416	0.625847
50%	0.295031	0.704969
75%	0.374153	0.768584
max	0.668123	0.819425



```
Out[133]:
```

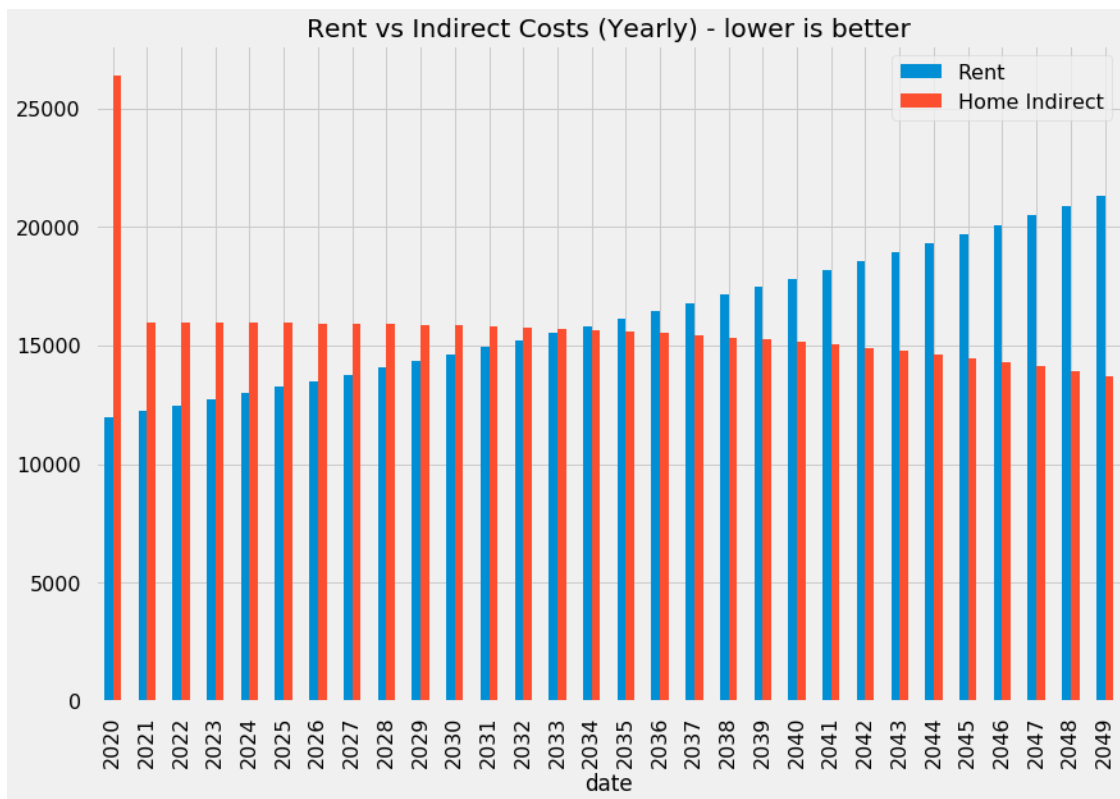
	interest	property_tax	homeowners_insurance	fees
count	30.000000	30.000000	30.000000	30.000000
mean	5139.890719	6628.125480	3421.704080	500.000000
std	2457.093361	1636.362007	600.149484	2738.612788
min	267.363585	416.666667	2523.044460	0.000000
25%	3321.248579	5779.717322	2916.496754	0.000000
50%	5567.600074	6680.858050	3371.220379	0.000000
75%	7219.781368	7722.306798	3896.744677	0.000000
max	8434.824540	8925.881725	4504.079288	15000.000000

4 Comparing Rent vs Home Ownership



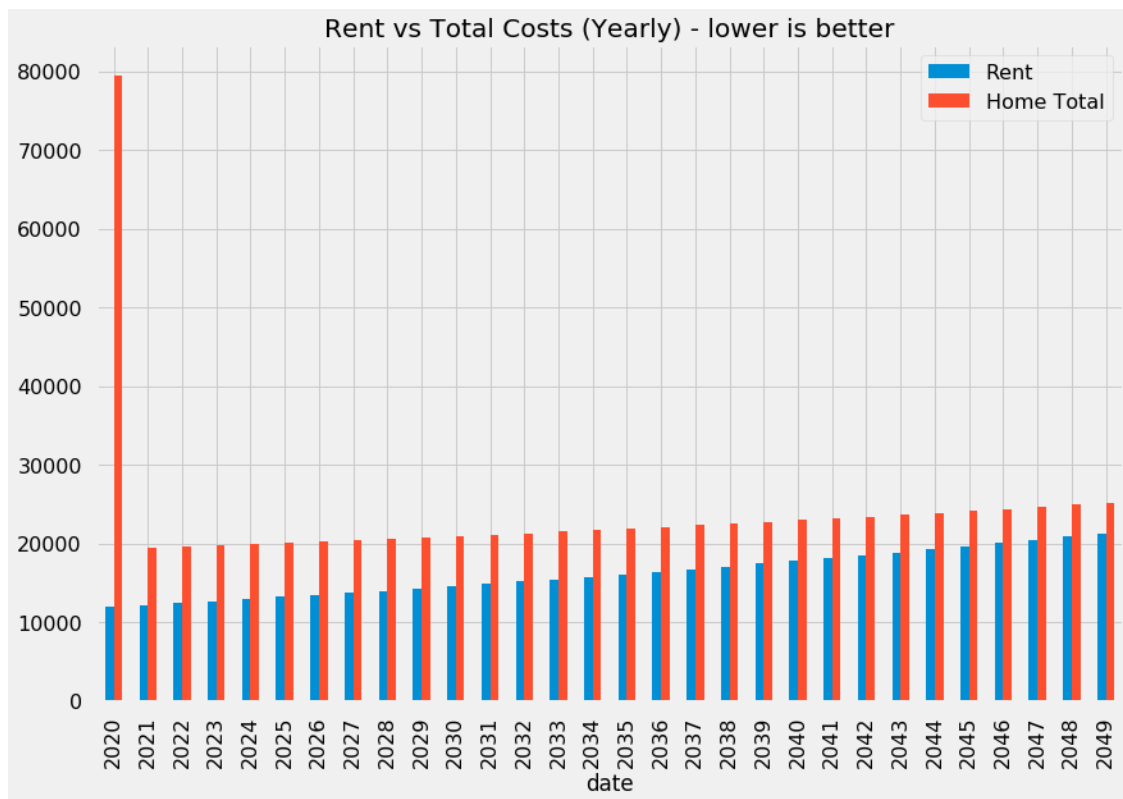
```
Out[138]:
```

	total_rent	total_indirect
count	360.000000	360.000000
mean	220151.334598	249773.126894
std	140436.159770	134514.805126
min	1000.000000	16333.333333
25%	96965.028846	133608.183680
50%	208193.937164	252320.227458
75%	337250.175408	367423.179712
max	486816.950462	470691.608396



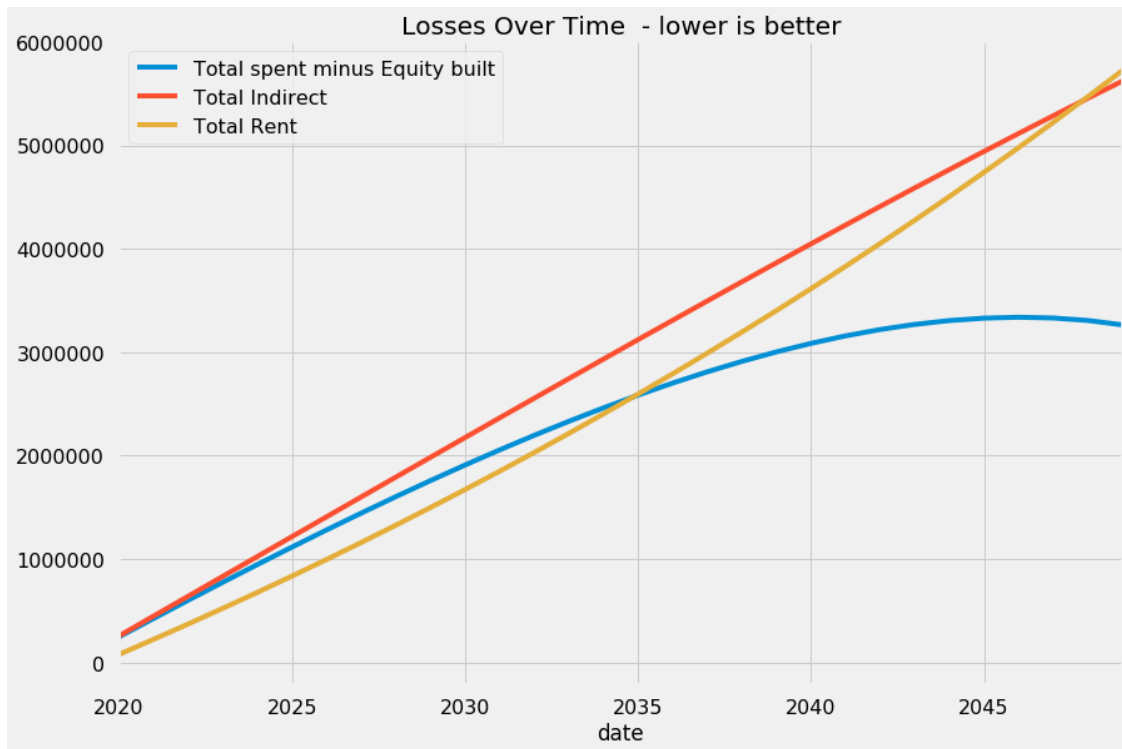
```
Out[140]:
```

	rent	indirect
count	30.000000	30.000000
mean	16227.231682	15689.720280
std	2820.585220	2129.859252
min	12000.000000	13697.324598
25%	13853.149152	14940.300055
50%	15992.082608	15619.678503
75%	18460.816069	15915.995445
max	21310.136284	26374.535667



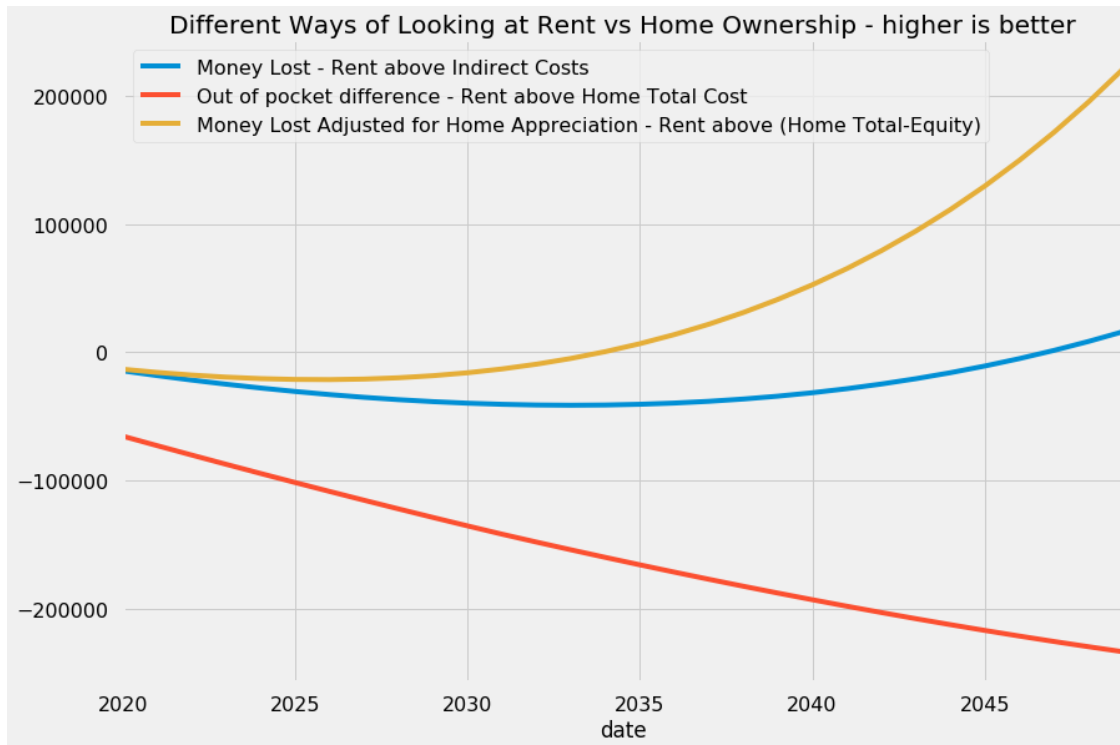
```
Out[142]:
```

	rent	total
count	30.000000	30.000000
mean	16227.231682	24013.868732
std	2820.585220	10613.834259
min	12000.000000	19481.449651
25%	13853.149152	20678.298941
50%	15992.082608	22061.530541
75%	18460.816069	23660.131929
max	21310.136284	79470.722064



```
Out[144]:
```

	net_loss	total_indirect	total_rent
count	3.000000e+01	3.000000e+01	3.000000e+01
mean	2.259346e+06	2.997278e+06	2.641816e+06
std	1.010179e+06	1.639203e+06	1.710685e+06
min	2.472125e+05	2.563181e+05	7.800000e+04
25%	1.483979e+06	1.648581e+06	1.201935e+06
50%	2.523666e+06	3.027450e+06	2.499198e+06
75%	3.204546e+06	4.365610e+06	3.996485e+06
max	3.338434e+06	5.622453e+06	5.724598e+06



```

Out [146]:
           rent_vs_indirect    oop_diff  rent_vs_net_loss
count              30.000000         30.000000         30.000000
mean          -26090.628861  -158063.778000         38578.814947
std           15556.855339    51451.780184         72722.114404
min          -41235.420156  -233599.111485        -21234.070846
25%          -38354.681254  -201787.520528        -17223.395968
50%          -30976.843109  -162895.365230          3717.452976
75%          -18704.529694  -117053.911394         75866.592961
max            16125.342066   -65333.333333        220945.558874

```

Home
Purchase price \$250000.00.
Yearly appreciation rate: 2.00%

Mortgage
\$983.88 fixed payment.
Yearly interest rate: 4.25%.
Down payment: 20.00%

Rent:
\$1000/month.
Yearly increase rate: 2.00%

4.1 Graph Summary

4.1.1 Money Lost - Rent above Indirect Costs:

Considering only rent vs our indirect expenses of insurance, interest, property taxes, and fees.

Renting starts out cheaper, but as the main indirect expense-mortgage interest-decreases, renting becomes more expensive towards the very end of the mortgage.

4.1.2 Out of pocket difference - Rent above Home Total Cost:

Considering the TOTAL cost of home ownership vs renting. This is how much money gets spent, whether it goes towards building equity or not.

4.1.3 Money Lost Adjusted for Home Appreciation - Rent above (Home Total-Equity):

Homes generally appreciate in value. Instead of measuring total indirect costs as our “cost of home ownership”, instead we should measure the total amount spent on the home, minus the amount of equity we’ve built up. With each principal payment we make, we own more and more of our house. This makes the difference in our net worth smaller than if we were only considering indirect costs.

5 Simulating Rental Income

Let’s be real - with all of the additional space we’ll have with a house, we should consider renting out a room. That being said, I only want to do it for the first few years to make owning a home more affordable upfront.

5.1 Guide

5.1.1 Additional out of pocket

Consider the difference between paying rent and the total cost of home ownership. This is the net difference we’d pay above renting.

$$\text{additional out of pocket} = (\text{total cost of home} - \text{rental income}) - \text{total rent we'd pay if we were renting}$$

5.1.2 Total out of pocket

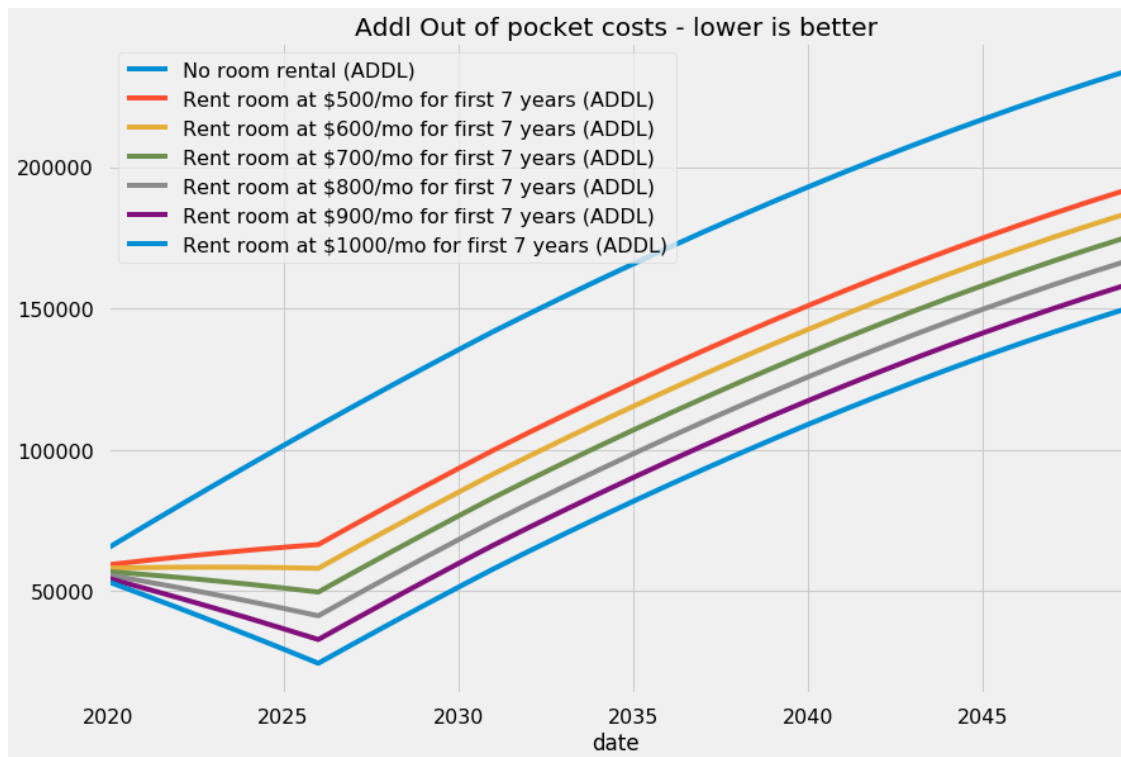
The straight total cost of home ownership

$$\text{total out of pocket} = \text{total cost} - \text{rental income}$$

5.1.3 Net loss

The net loss in total wealth.

$$\text{net loss} = \text{total cost} - \text{equity} - \text{rental income}$$



```
Out[152]:
```

	No room rental (ADDL)	Rent room at \$500/mo for first 7 years (ADDL) \
count	30.000000	30.000000
mean	158063.778000	120263.778000
std	51451.780184	45192.105982
min	65333.333333	59333.333333
25%	117053.911394	75053.911394
50%	162895.365230	120895.365230
75%	201787.520528	159787.520528
max	233599.111485	191599.111485

	Rent room at \$600/mo for first 7 years (ADDL) \
count	30.000000
mean	112703.778000
std	44091.572129
min	58090.741535
25%	66653.911394
50%	112495.365230
75%	151387.520528
max	183199.111485

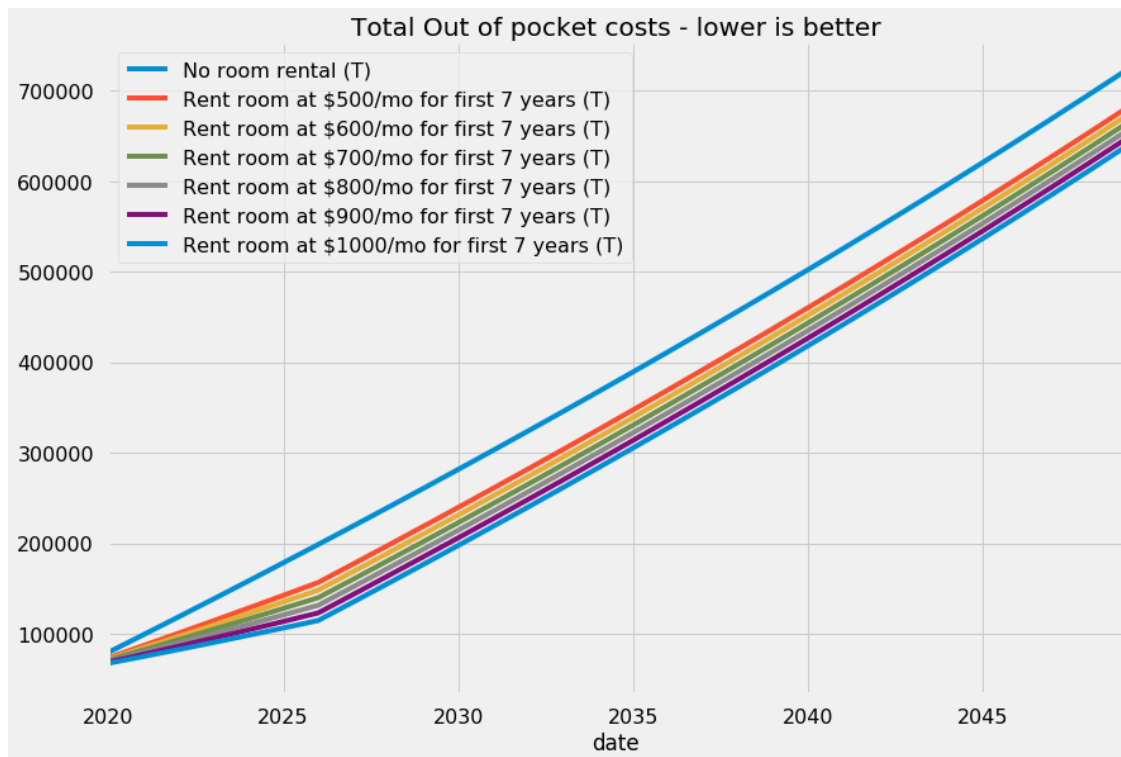
	Rent room at \$700/mo for first 7 years (ADDL) \
count	30.000000
mean	105143.778000

std	43050.951230
min	49690.741535
25%	58533.381366
50%	104095.365230
75%	142987.520528
max	174799.111485

	Rent room at \$800/mo for first 7 years (ADDL) \
count	30.000000
mean	97583.778000
std	42074.688949
min	41290.741535
25%	55133.477431
50%	95695.365230
75%	134587.520528
max	166399.111485

	Rent room at \$900/mo for first 7 years (ADDL) \
count	30.000000
mean	90023.778000
std	41167.364232
min	32890.741535
25%	51662.868246
50%	87295.365230
75%	126187.520528
max	157999.111485

	Rent room at \$1000/mo for first 7 years (ADDL)
count	30.000000
mean	82463.778000
std	40333.629700
min	24490.741535
25%	45792.480675
50%	78895.365230
75%	117787.520528
max	149599.111485



```
Out[154]:
```

	No room rental (T)	Rent room at \$500/mo for first 7 years (T) \
count	30.000000	30.000000
mean	386099.809165	348299.809165
std	194241.240579	188266.544563
min	79470.722064	73470.722064
25%	224364.150885	182364.150885
50%	378491.578254	336491.578254
75%	543289.140030	501289.140030
max	720416.061947	678416.061947

	Rent room at \$600/mo for first 7 years (T) \
count	30.000000
mean	340739.809165
std	187109.460988
min	72270.722064
25%	173964.150885
50%	328091.578254
75%	492889.140030
max	670016.061947

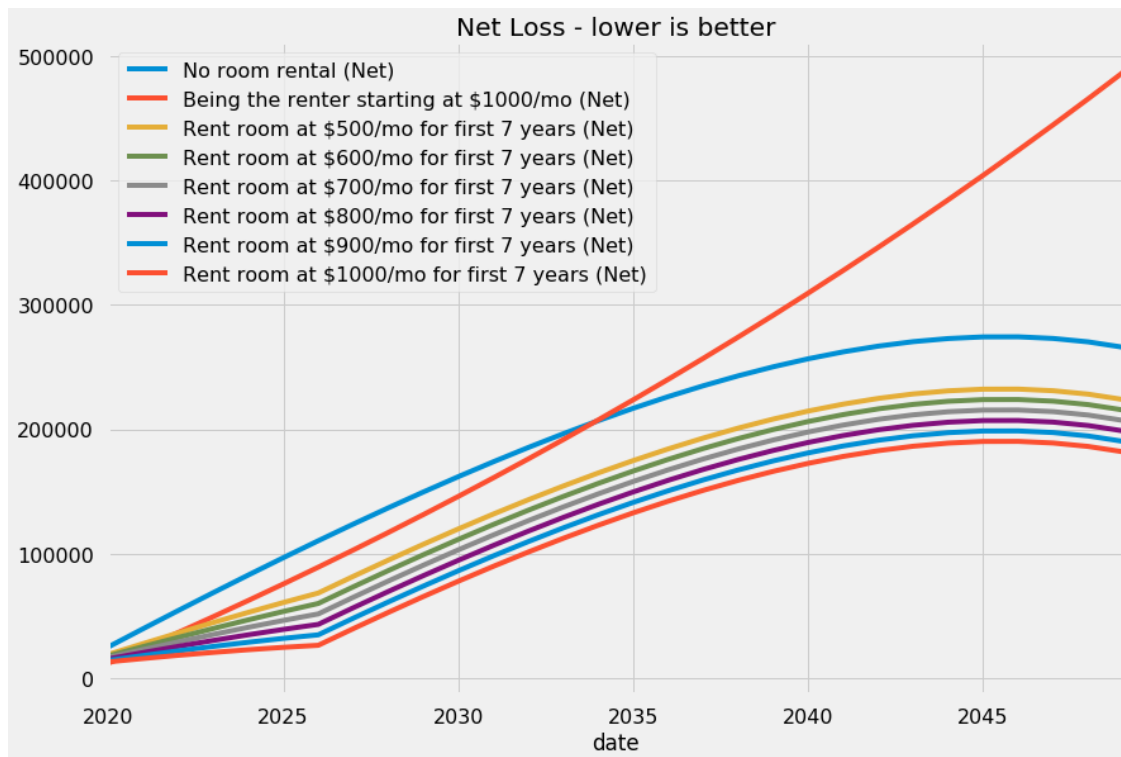
	Rent room at \$700/mo for first 7 years (T) \
count	30.000000
mean	333179.809165

std	185965.551543
min	71070.722064
25%	165564.150885
50%	319691.578254
75%	484489.140030
max	661616.061947

Rent room at \$800/mo for first 7 years (T) \	
count	30.000000
mean	325619.809165
std	184835.060822
min	69870.722064
25%	157164.150885
50%	311291.578254
75%	476089.140030
max	653216.061947

Rent room at \$900/mo for first 7 years (T) \	
count	30.000000
mean	318059.809165
std	183718.236539
min	68670.722064
25%	148764.150885
50%	302891.578254
75%	467689.140030
max	644816.061947

Rent room at \$1000/mo for first 7 years (T)	
count	30.000000
mean	310499.809165
std	182615.329433
min	67470.722064
25%	140364.150885
50%	294491.578254
75%	459289.140030
max	636416.061947



```

Out[156]:      No room rental (Net)  Being the renter starting at $1000/mo (Net)  \
count              30.000000              30.000000
mean            189010.000839            227588.815785
std              81394.570265            143849.846217
min              25112.312528             12000.000000
25%             127069.541448            106510.606744
50%             211878.760049            215596.213024
75%             264947.889338            341501.619503
max             274253.275804            486816.950462

      Rent room at $500/mo for first 7 years (Net)  \
count              30.000000
mean            151210.000839
std              74203.604433
min              19112.312528
25%             85069.541448
50%            169878.760049
75%            222947.889338
max            232253.275804

      Rent room at $600/mo for first 7 years (Net)  \
count              30.000000
mean            143650.000839

```

std	72836.301508
min	17912.312528
25%	76669.541448
50%	161478.760049
75%	214547.889338
max	223853.275804

	Rent room at \$700/mo for first 7 years (Net) \
count	30.000000
mean	136090.000839
std	71495.846754
min	16712.312528
25%	68269.541448
50%	153078.760049
75%	206147.889338
max	215453.275804

	Rent room at \$800/mo for first 7 years (Net) \
count	30.000000
mean	128530.000839
std	70183.778525
min	15512.312528
25%	59869.541448
50%	144678.760049
75%	197747.889338
max	207053.275804

	Rent room at \$900/mo for first 7 years (Net) \
count	30.000000
mean	120970.000839
std	68901.718501
min	14312.312528
25%	51469.541448
50%	136278.760049
75%	189347.889338
max	198653.275804

	Rent room at \$1000/mo for first 7 years (Net)
count	30.000000
mean	113410.000839
std	67651.372758
min	13112.312528
25%	43069.541448
50%	127878.760049
75%	180947.889338
max	190253.275804