**Which Iphone models have the best long term value**

**Introduction**

One knows that iPhone, like everything else depreciates. And this depreciation occurs mainly right after purchase and after the release of a new model a year later. Fortunately, iPhone depreciate much less than other smartphone competitors. [SellCell](https://www.sellcell.com/smartphone-depreciation/) has a great graphical and tabular view on these depreciation numbers. The question I want to analyze today is whether there are certain iPhone models that hold their value better than others. This will hopefully be of use to consumers in their iPhone purchase decision.

**Methods and Assumptions**

For this analysis I am only looking at the base model of each iPhone released (lowest storage). All iPhone models since the release of the 6S will be considered, since that is the oldest iPhone still receiving software updates. However, note that from the SellCell graphical depreciation view, iPhone values are really volatile in the first few months after launch. Due to this, the iPhone SE 3 2022 was excluded from this analysis.

I also assume a given customer would buy an iPhone at launch for MSRP and then keep that phone for 3-5 years, which smooths out the high depreciation hits taken immediately after purchase and after 1 year when the new models are released. From looking at the SellCell graphs for depreciation, it seems over the long term, assuming linear deprecation is justifiable so that method of depreciation will be used. Also, as for current value for any given iPhone, the highest selling price given on bankmycell.com will be used. One can probably obtain a higher selling price selling it on swappa or facebook marketplace, but those have additional expenses (paypal, shipping, etc…) and time requirements. Therefore, to compare everything on a similar basis bankmycell.com prices will be used. Both percent and absolute depreciation will be considered.

Python was used to scrape bankmycell on a single day. This was then compared to MSRP of that given iPhone. The Python Code can be found in my github.

**Discussion**

Here are the main takeaways from this analysis, some of which are quite intuitive. Please refer to the 2 interactive plots in Tableau Public to explore these takeaways in further detail yourself.

<https://public.tableau.com/app/profile/abhinav.gadde/viz/IphoneDepreciationVisualization/PercentDepreciation?publish=yes>

1. The longer one holds onto their iPhone, the lower the relative and absolute depreciation

This seems to follow an exponential curve. After fitting an exponential curve, which can be viewed in the python code, it isn’t as steep in the beginning as you would first assume. However, it is still true that the iPhone depreciates at a slower rate the longer you have held it. And this is a good chart for someone who upgrades their iPhone often. Those who upgrade once every 1.5 years seem to have an average cost of 2.8%/mth whereas one who sells their iphone once every 6 years has a monthly cost of approximately 1.3% a month. Is it worth nearly 2x the monthly cost to upgrade more often than needed? Note this does assume that all iPhones depreciate at roughly the same rate, which I think is a reasonable assumption to make.

1. Pro Max models seem to hold their relative (percent) value better than Regular and Pro models. The exception to this rule is the iPhone XR, which holds it value as well as the XS Max.

Note, however this isn’t a very large difference (except for the iPhone 13 series). This leads to the more expensive models still having a higher absolute depreciation. Also, as the phones get older this difference gets much smaller. So, it really only is a factor if you plan on keeping your phone for under 18 months. Then you could have your pro-max phone depreciate about 30% less than the regular version (compared iPhone 12 models to get the 30% metric).

1. The plus sized models (for iphones 6,7 and 8) hold their relative value better than the regular versions

Note this is not really that helpful since the older a phone gets, the closer the overall percent depreciation of different models get. Therefore, these older models phone have nearly the same depreciation between model types.

1. Cheaper phones (The SE series specifically) lose far less absolute depreciation than other models because their price was lower to start with.

Surprisingly, their relative/percent depreciation is in the range of the iPhone models that released right before or after it, which is interesting to see. My hypothesis was that these SE models would have a higher percent depreciation since, like the mini models, I assumed they weren’t as popular.

**Conclusion**

I assume the average consumer, like myself, cares to spend as little money on a smartphone as possible per month. Therefore, the absolute depreciation of a phone is more important than its percent depreciation. Using the last takeaway listed in the conclusion section, this would lead to my recommendation of simply buying the cheapest lineup of phone Apple sells (the SE lineup) and use that until it no longer gets software updates. This will most likely will be 7 years from launch since the iPhone 6S has been supported that long so far. I actually hypothesize the updates may last longer than that since computing power has increased greatly over the past few years while the software has not gotten that much more demanding. Buying the iPhone SE lineup is what I personally do for me and my family.

**Limitations**

This is a single set of data points pulled on a single selling day. Therefore, there may be outliers. I personally pulled data from a couple of days and they are all pretty similar so I don’t think this is the case but there is a small chance it is. I also made many assumptions throughout this paper so be sure to consider those assumptions when reviewing the takeaways stated.

Note in this analysis we assumed linear depreciation. However, this is a very rough approximation and only fine to use if keeping the iPhone for longer durations (3-5 years) of time. Unfortunately, to do a more detailed analysis a time series of selling prices would be needed and this data does not seem to publicly be available anywhere (let me know if you find anything though). It is possible to scrape data daily or weekly for a few years to build up this information, but I don’t personally think it is worth the time, since the conclusion will still probably be to buy the special edition iPhones and keep them a long time.

Note this only considers you buying a new iPhone at launch and does not consider the economics of buying a used phone. This is because finding used phone prices is quite difficult and vary widely between sellers. Also, I didn’t consider buying it from carriers for a reduced price since that often comes with a stipulation that you have to pay a much higher monthly cell phone plan price for a fixed period of time.