Why are we doing this project?



Apple products hit by the 30% and 15% tariffs 
A recent analysis showed that the following Apple products will be hit by 30% tariffs on September 1 : 
• Desktop Macs (though Apple could argue the iMac should be exempt) 
• Apple Watch 
• AirPods and all wireless Beats headphones 
HomePod 
While the 15% tariff landing on December 1 5 will apply to a wider range of Apple products: 
iPhone 
iPad 
MacBook/Air/Pro 
iPod touch 
Apple TV 
• Apple Pro Display XDR 
Keyboards 
• Wired headphones 

Source: <https://9to5mac.com/2019/08/29/15-tariffs/>

1. <https://www.straitstimes.com/world/united-states/trump-says-apple-wont-get-tariff-relief-on-parts-made-in-china>

These decisions will directly impact the Apple's supply chain costs and hit the company's bottom line - we wish to understand how could Apple optimise it's supply chain: specifically on the manufacturing components.

**Objective:** Minimise the manufacturing and assembling cost of iPhone, considering the forthcoming tariffs on iPhone products. We will not be discussing the distribution costs here - the idea here is to understand whether Apple can successfully mitigate the increase to the cost of iPhone due to US tariffs levied on China by moving it's supply chain to plants around the world.

[Michael] questions: if the objective is to simulate where is the best location for manufacture to avoid the tariff, we might need below information available for decision?

1. What is the component of manufacturing cost?
   1. Raw material cost? It seems available in below chart, do we need assume the price changes if move to another country
   2. Assembling cost? Overhead per different countries?
   3. Factory setup cost?
   4. New location countries any tariffs with US?
2. List of countries as potential location?

Hi Michael, I have tried to provide answers for you (I have bunched the answers up):

1. I don’t think we should assume a change in price if we move across countries – although it is not a realistic scenario, I hardly believe we will have enough data to understand what is the cost of an iPhone being sold US if it were assemebled in non-Chinese factory. Also, China has a significantly big role in assembly than production of raw goods – I believe assembly cost can be treated just like any other raw material cost with further restrictions on how much is the total quantity that is normally sold in US. Factory set-up cost would be a fixed investment cost – I am not sure whether we keep it or not (& if we keep it – how do we incorporate it?)

Lastly, Apple/suppliers already have some factories outside China – we use these locations as default locations to switch productions

 [Michael]

If I understand correctly, you are saying the objective is to study how Apple could shift the products between their existing factories, consider the imposed tariffs impact.

And the assumption is Apple’s different factories manufacturing cost are the same?

Some hypothetical assumption(s) that might not really hold up as we move across the countries:

1. Cost of producing an iPhone does NOT change as we move across countries

[Michael] sorry, I don’t get this point, if the cost of producing don’t change, then what would the decision variables?

Some stats to know for the project:

Here is a high-level view into the costs of the various components of the iPhone Xs Max: 
$500.00 
$450.00 
$400.00 
$350.00 
$300.00 
$250.00 
$200 00 
$150.00 
$100.00 
$0.00 
5453.00 
$24.50 
$58.00 
$35.00 
$14.50 
$23.00 
$64.50 
S90.50 
$44.00 
$1&00 
S9.oo 
$72.00 
Apple iPhone XS Max 
A1921 
$24.55 
$45.71 
$32.51 
$14.16 
$23.31 
$45.35 
$77.27 
$42.80 
17.11 
$6.46 
S6Q2 
Apple iPhone X 
A1091 
Total 
Test/Assembly/Supporting Materials 
• Mechanicals/Housings 
Other Electronics 
Power ManagernenVAudio 
Mixed Signal/RF 
Memory 
• Display 
Cameras 
• Connectivity & Sensors 
Battery 
Appli cations Processor/tvloderns 
Tech 
Insights 

Source: <https://www.techinsights.com/blog/apple-iphone-xs-max-teardown#costing>