Network Externalities

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- Benefit to a consumer increases when the number of owners increases – telephone, email are very common examples of direct network externalities.

- Using windows in PC or Android in smart-phones are examples of indirect network externalities – more softwares and smart-apps will be developed for these common platforms.

- Demand curves for commodities having network externalities are different from those for other commodities – size of the network matters.

- That is why, number of fax users is still very less at individual level in India but every institution has one!

Consumer Expectation

- Demand depends on the expected size of the network. Suppose there are 1 million potential buyers for a new technology (app, OS etc.)
- Each consumer's valuation is *n* given there are *n* other buyers. Larger the value of *n*, greater will be the valuation by each potential buyer.
- Therefore if a consumer thinks that no one is going to join the network, then his valuation will be $n^e = 0$
- Hence, given such situation, for any positive price, benefit will be negative and the NE will be no one joining the network.
- On the other extreme, each can expect that every other will join and hence may value the technology at 1 million!

Consumer Expectation (Continued)

- This is a case of fulfilled-expectations equilibrium.
- As we have already seen, depending on what a potential consumer expects, for any positive price there can be two equilibria – one where everyone buying the technology and the one where no one is buying.
- Low-adoption equilibrium is more likely if the price is very high – if the price is half a million, then it takes all the half-million consumers to believe that half a million users are there in the network.
- If the price is low, say 500, then at least 500 consumers may believe that at least 499 consumers are there in the network apart from him.
- Once, these 500 consumers are there in the network, then it is optimal for other potential buyers to join the network – this initial set of buyers is known as the **critical mass**.

Lock-in

- Suppose there are two competing technologies – A and B (like windows and Linux, Vodafone and Airtel etc) and two types of consumers – fan A and fan B

  $U_A = u + n_A$ if he buys A

  $= n_B$ if he buys B

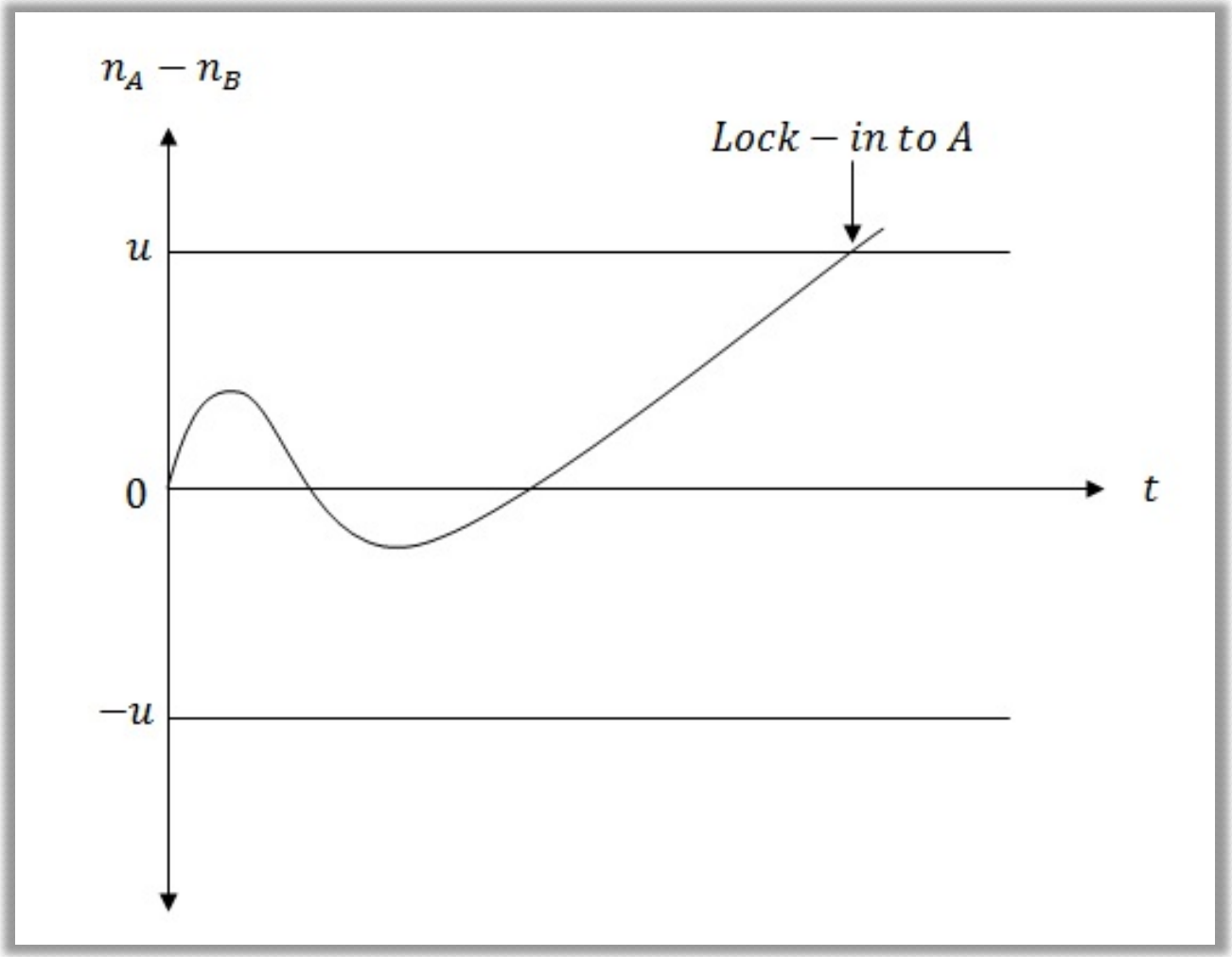
  u is known as the stand-alone utility.

- If $n_A = n_B$ then fan A buys A and fan B buys B.

- If $n_B > n_A + u$ then fan A will buy B and not A. That is, higher the base of a particular technology, both types will buy that technology only – explains the dominance of Windows OS in the world market!

- Stand-alone utilities are the absorbing barriers, once such barriers are crossed, the process becomes self-enforcing and the industry is locked-in.

Lock-in (path-dependency)



Compatibility

- Compatibility – STATA is available for all types OS (independent of the fact that whether the OS is Windows, Linux or Mac), dual-sim mobiles

- Compatibility implies lower level of product differentiation and higher price competition.
- However, compatibility implies consumers are better off – if the producer can capture some of the CS accruing due to compatibility, then compatibility may be preferred.

- Consider a two-stage game –

1. Firms decide whether to make technologies compatible or not. If consensus is not reached then the firms go for a standardization war.
2. Product market competition takes place. If compatibility was reached then they share duopoly profits. Otherwise the winner of the standardization battle enjoys monopoly profits.

Compatibility (Continued)

- The result depends on how the standard technology is chosen.
- Assume both has the chance – that is probability is half for both.
- Then they will not go for compatibility if $\pi^m > 2\pi^d$
- If getting to the standard-setting is very costly (say auctioning), then they opt for compatibility.
- If product market competition is more tough, then they opt for incompatibility.
- Benefits go to consumers if products are compatible, but such firm behavior implies less competition (consumer do loose from that) and less product variety. Consumers are even worse if there is a monopolist.