I. Market Failures and Knowledge

Economists argue that general market failures for knowledge occur with indivisibilities, uncertainty, and public goods. Market failures for indivisibilities occur because marginal cost pricing is difficult to accurately accomplish and knowledge in general requires a large fixed cost. The price of knowledge must be set high enough to cover fixed costs but then the product created from the knowledge is unreasonably high. Think of how expensive new drugs are when they are first released on the market. This is because the cost of hiring chemists with the knowledge needed to develop the new drug, as well as the facilities and high-tech tools, must be recovered by setting a high price on the drug. In addition, knowledge can be expensive if one factors patents into the formula. Some companies may need to pay a licensing fee for using a particular technique or compound when developing or producing their product because another firm has a patent on a process which the company needs to use. For this reason, some innovative research may not be undertaken because the cost to the firm is higher than the private benefits that can be recovered. Next, there are market failures with how markets deal with uncertainty because of moral hazard. When a particular research project fails, for instance, it is sometimes hard to decipher why the project failed. There are many external factors that must be taken into consideration, such as personal motivation, the economy, politics and randomness, and these factors are very hard to test and account for. This can effect innovative research because if a firm perceives that a project failed due to an incorrect factor, say a firm thinks a project failed because of the nature of the research and it was actually due to the person carrying out the research, the firm may decide to discontinue R&D in that area. By deciding to cease researching in that area, the public suffers
because they will not reap the benefits had the research continued. Last, public goods account for market failure because too little research may be done in areas where the public benefits. For example, a firm will not do research that has a high social rate of return but a low private rate of return. Economic incentives are more important to private industries and therefore the government steps in to promote research in the areas that are beneficial to the public but are not undertaken by private firms. Another example is the problem with free riders. When the government provides benefits for conducting research and firms carry out R&D that they would have done even without the benefit, the public suffers by paying for the research through their taxes (that would have been done by the firms regardless) and by losing out on new research that could have been done if the government put that money into any area where free-ridership would not occur.

Due to the above mentioned market failures, the government sometimes steps in by regulating intellectual property rights, giving direct subsidies for R&D, and R&D tax credits. By regulating intellectual property rights, through the use of patents, the government is able to promote R&D. Allowing patents creates incentives for firms to carry out research because the patent will allow them to have sole rights over that process or new knowledge for a period long enough to recover the costs of their research as well as a period of time where they will receive economic profits. For firms, patents are necessary to continue their research. This type of government intervention method is very effective because whoever gets rights to the patent will surely receive large economic profits from their innovation. On the other hand, it can stifle innovation by limiting the flow of knowledge. For instance, if a computer company would like to develop a new product to help the handicapped but can not apply a necessary process to their design
because it is held as a patent by another firm, the research will never be done and the product will never be created. In this way, patents can inhibit innovation. As we discussed in class, there are many pros and cons, and due to the rapid increase in knowledge and R&D in this “information age” it is too soon to tell what effect dominates.

The next way the government intervenes is through subsidies. Subsidies are a very effective method for the government to promote a R&D for a specific area of research. The government can stipulate what it wants done and get exactly what it wants because it is giving the subsidy. For instance, the government may subsidize stem cell research (and that kind of research will produce specific results desired by the government that may have positive spillover effects in society), or it can subsidize nuclear energy research which would not be done in the private sector because the government is the only consumer. Last, the government can use R&D tax credits. Tax credits help stimulate R&D by lowering the costs of research. This encourages firms to pursue certain types of R&D (depending on what kind of research the tax credit is for) that would otherwise not be done due to financial constraints. A downfall here is that there may, again, be free riders. Some firms may have carried out the research with or without the tax credit. Therefore, the government needs to be careful to choose tax credits on types of research that produce substantial social benefits which would otherwise not be produced due to the high cost or other barriers to conducting that kind of research. Firms are still concerned with private returns, so the tax credit needs to be large enough to encourage firms to do the research, usually between 15%-20%, but the tax credits should not be so high that the cost outweighs the social benefits reaped from the R&D.
This is a strong answer that raises some important points, but there are a couple of possibilities for improvement. One thing that the author does well is provide clear examples of how economic concepts apply in the real world. A good example of this is on page one, where the author writes:

“The price of knowledge must be set high enough to cover fixed costs but then the product created from the knowledge is unreasonably high. Think of how expensive new drugs are when they are first released on the market. This is because the cost of hiring chemists with the knowledge needed to develop the new drug, as well as the facilities and high-tech tools, must be recovered by setting a high price on the drug.”

In general, the answer needs more organization to make it easier for the reader to follow. Shorter, more direct paragraphs would help illustrate each key point to the reader. For example, each of the market failures discussed in the first paragraph could be presented in a separate paragraph. A stronger introduction with a more general explanation of market failures could help to tie these paragraphs together. Also, some more details about what types of projects tax credits and subsidies are more or less likely to subsidize would help.