universities that had never applied for patents before and that universities that had always patented began to do so more intensely."[188]

c) Anticommons Concerns

While some Bayh-Dole opponents admit that the Act had a positive effect on patenting, especially in biotechnology, they advance the argument that the rise in patenting will lead to an anticommons concern and deter innovation in the long run.[189] Two potential routes to an anticommons issue exist, one being "creating too many concurrent fragments of intellectual property rights in potential future products" and the other being "permitting too many upstream patent owners to stack licenses on top of the future discoveries of downstream users."[190] Both examples are potentially exacerbated by the presence of Bayh-Dole, where early-stage patenting is encouraged and the ability to grant many nonexclusive licenses is incentivized.

The real-world effects of an anticommons scenario would be a reduction in use, commercialization, and further research and development of inventions. Empirical evidence points against the anticommons concern being prevalent today, even in the biotech industry, where upstream patenting occurs frequently. The next section produces evidence in support of this contention.

2. Bayh-Dole's Effect on Commercialization

Whether or not the BDA has achieved its policy objective of "promot[ing] the commercialization and public availability of inventions" is a major factor in determining the success of the Act.[191] An increase in commercialization would effectively refute the hypothesis that the BDA creates an anticommons effect.[192]

Economists at the Max Planck Institute for Economics have undertaken to determine how technology is being transferred, and what factors affect the flow of

188 Charles R. McManis and Sucheol Noh, The Impact of the Bayh-Dole Act on Genetic Research and Development: Evaluating the Arguments and Empirical Evidence to Date 13, *available at* papers.ssrn.com/sol3/papers.cfm?abstract_id=1840639.
189 *See, e.g.* Heller and Eisenberg, *supra* note 103.
190 *Id.* at 699.
191 35 U.S.C. § 200 (2009).
192 By showing an increase in commercialization, it would be clear that the resource at issue (the patent) is not being underused. *See* Chapter IV-B-1, *supra*.

knowledge and invention.[193] The economists used statistical models which can be summarized by the forthcoming results.

As a preliminary issue, the researchers found that the likelihood that an invention is successfully licensed is enhanced by the presence and scope of patents related to the invention.[194] This finding refutes the anticommons concern of Bayh-Dole critics.[195]

With respect to other related issues of commercialization, the economists' findings were not so clear. For example, the researchers could not confirm their hypothesis that "academic inventions from collaborative research with industry partners are more likely to be licensed than other inventions" and reject the hypothesis that "spin-off licensees significantly differ from external licensees in their likelihood to commercialize inventions or in the level of royalties."[196] Thus, even though data shows Bayh-Dole has led to an increase in collaborative work and creation of startups, the evidence questions the effects of this on technology transfer.[197]

Despite the potential shortfalls noted in the Max Planck study, statistics show that commercialization has been widespread since Bayh-Dole. University research created 1.32 products, on average, per day, from fiscal year 2006.[198] This success is unique to the United States and vastly greater than the amount prior to Bayh-Dole. Even more notably, there were nearly 5,000 existing university licenses in 2006, which shows clear evidence of the university-industry partnership that Bayh-Dole has fostered.[199] Numerous universities point to Bayh-Dole as the driving factor behind the development and commercialization of life-saving drugs.[200] Despite critiques from opponents of the Act, the BDA's effects on commercialization are clear and positive.

3. Bayh-Dole's Effect on Research and Scientific Progress

As previously noted, critics argue that a weakness of the BDA is that it shifts the focus from basic to applied research, and that it creates conflicts of interests in

193 *See* Guido Buenstorf and Matthias Geissler, *Not invented here: Technology licensing, knowledge transfer and innovation based on public* research, Papers on Economics and Evolution, Max-Planck-Gesellschaft (December, 2009).
194 This is true for both domestic and foreign licensees. *See id.* at section 6.1.
195 While Bayh-Dole does promote patenting, patented inventions are more likely to be licensed, which inevitably results in commercial use and future development. *See id.*
196 *Id.* at section 6.2 (hypothesis 2a and 5).
197 For statistics regarding startups, see footnote 77, *supra.*
198 *See* Bremer et al., *supra* note 175, at 9.
199 *See id.*
200 *See* Emory Press Release, *supra* note 3 ; *see* Bremer et al., *supra* note 175 , at 9.