technology, but lessens the exclusionary power of patents.

The patent protection is the wrong kind if cross licensing agreements can be used as a fulcrum for industry wide price-fixing and entry-excluding cartels that suppress competition more than would have been possible if each firm had independently exploited its own patented technology. A patent holder's power to block the use of its inventions by others poses a special problem in small economies and LDCs.

Economy-wide efficiency may suffer from patent provisions that are too strong. Excessive monopolization through a series of patents could enable such a patentee to place onerous conditions on licensees and potential competitors. Too strong patent protection would also divert resources into R&D activities beyond the optimal desirable level. If, for example, there is limited availability of skilled people and risk taking entrepreneurs, then a stronger patent protection would result in increased demand for these factors in industries where the patent protection is effective. In other words, too strong patents would drive up the cost of doing R&D in all sectors of the economy. Moreover, the administrative costs of enforcing a patent system may be significant, including the private and public costs of litigation.

It is often argued that the absence of patents might have particularly serious negative effects for independent inventors and fledgling firms. On this, the evidence is sparse, but offsetting tendencies can be identified. Small firms are at a severe disadvantage trying to claim patent rights and enforce them against large rivals better able to sustain the multimillion-dollar costs of protracted patent litigation. Thus, even though they need patent protection as much as the well-established companies, the protection they actually receive may be more fragile.

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Patents can be used as a measure of innovative activity across different firms, especially in the long run.[25] There is a strong relationship between patent numbers and R&D expenditures, and this relationship is close to being proportional. Mansfield[26] finds that, for the major firms in the petroleum, steel, and chemical industries in the United States, a positive relationship exists between innovative activity and R&D expenditures.

[25] Zvi Griliches, "Patent Statistics as Economic Indicators: A Survey", *Journal of Economic Literature*, Dec. 1990: 1661-1707.

[26] E. Mansfield, 1968, *op. cit.*