Innovation Tax Incentives
Overview and Survey of Literature

This paper will provide an overview of (A) the general policy goals of innovation tax incentives, (B) current tax provisions favoring research and experimentation, (C) alternative innovation tax incentive proposals, and (D) innovation tax incentives as compared with other incentives to innovate.

A. General Policy Goals of Innovation Tax Incentives

Ideally, an innovation tax incentive should:

- encourage additional research and development (R&D) investments.
- increase positive externalities/spillovers.[1] Externalities are economic effects from an activity captured by those who are not party to such activity; for R&D, positive externalities are "the involuntary leakage, as well as the voluntary exchange of useful technological information."[2]
- reduce negative product market rivalry. That is, it should reduce a variety of wasteful competition, where firms inefficiently race to make discoveries and secure a larger share of the market.[3]

According to commentators, an effective R&D tax incentive has the following features:[4]

- It targets small and new firms. However, tax jurisdictions should avoid a "small business trap" where the preferential treatment is substantially size-based and discourages businesses from growing.
- It provides refundable tax credits, either fully refundable or capped at a reasonable amount; credits to offset non-corporate income taxes (e.g. labor taxes); or credits that can be converted to a government grant, because new firms often have negative profits in their earlier phases. Other commentators add that deferral of the benefit of tax credits and deductions can significantly reduce their value to investors.[5] A tax credit

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[1] Jas. Furman, "Encouraging Innovation and the Role of Tax Policy" (March 11, 2016) https://www.whitehouse.gov/sites/default/files/docs/20160311_innovation_and_tax_policy_itpf.pdf.
[2] G. Steurs, SPILLOVERS AND COOPERATION IN RESEARCH AND DEVELOPMENT, doctoral diss. Katholic Univ. Leuven (1994).
[3] Jane Gravelle, "A Patent/Innovation Box as Tax Incentive for Domestic Research and Development," Congressional Research Service No. R44522 (June 13, 2016) https://www.fas.org/sgp/crs/misc/R44522.pdf.
[4] Int'l Monetary Fund (IMF), "Fiscal Policies for Innovation and Growth" (April 2016) https://www.imf.org/external/pubs/ft/fm/2016/01/pdf/fmc2.pdf.
[5] Alessandro Modica & Thos. Neubig, "Taxation of Knowledge-Based Capital: Non-R&D Investments, Average Effective Tax Rates, Internal vs. External KBC Development and Tax

that is refundable if there is a negative tax liability would be more effective for these new firms.

- It targets incremental R&D, i.e., expenses above some baseline amount. Incremental R&D is more effective to target because doing so avoids a windfall gain for existing R&D below the baseline.
- It gradually expands R&D tax incentives. A gradual expansion of incentives is preferable to a large immediate increase because it corresponds more to the needs of society. Large immediate increases might simply raise the wages of researchers, who tend to be in fixed supply in short term.
- It is well-administered, in order to avoid abuse of R&D tax incentives.

Commentators note there are many types of non-R&D knowledge-based capital (KBC) investments that have potential positive spillovers but generally are not entitled to specific tax incentives.[6] These non-R&D KBC investments may worth special tax incentives, and even in the absence of tax incentives, such non-R&D KBC can be affected by a country's general tax rules regarding depreciation and limitations on losses. While such KBC is generally not a focus of the tax or other incentives discussed below, the appropriateness of applying such incentives to KBC ought to be kept in mind.

Limitations," OECD Taxation Working Papers No. 24 (2016) http://www.oecd-ilibrary.org/taxation/taxation-of-knowledge-based-capital_5jm2f6sfz244-en.

[6] *Id.*

B. Current Tax Provisions Favoring Research and Experimentation[7]

1. Research and experimentation tax credit (R&E tax credit) under Internal Revenue Code section 41

The U.S. Congress made the R&E tax credit permanent at the end of 2015. There are two methods for companies to calculate eligible R&E tax credits:

a. Traditional research tax credit: A credit of 20 percent in excess of qualified research expense ("QRE," including in-house research expenses and contract research expenses) for the current tax year over a base period amount. The base period amount is the product of the taxpayer's (1) fixed-base percentage, and (2) average annual gross receipts for the four tax years preceding the current year. The base period amount cannot be less than 50 percent of qualified research expense for the credit year. The fixed-base percentage is the ratio of qualified research expenses to gross receipts over the 1984-1988 period;[8] or alternatively,

b. Alternative simplified credit: A credit of 14 percent in excess of 50 percent of the past three years' research expenditures[9]

Because additional research spending increases the base in the future, reducing future credits, the marginal effect of the credit is estimated at 7.9 percent. Weighting the R&E credit by the spending on the 20 percent and 14 percent credits results in an effective credit of 11.3 percent. A full basis adjustment is made, meaning that the amount of the deduction for R&E is reduced by the amount of the credit. Unused R&E credits can be carried back one year and carried forward twenty years. Start-up companies with annual gross receipts of less than $5 million can apply up to $250,000 of R&D credit against their payroll tax liability annually.[10]

2. Expensing of intangible costs under Internal Revenue Code section 174[11]

Generally, expensing allows R&D costs to be deductible immediately rather than being recovered over the life of the assets. When the R&D investment is marginal (i.e., earns just enough to break even), expensing is the equivalent of a 0 percent tax rate.

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[7] *See* Gravelle, *supra* n. 3.
[8] Internal Revenue Code section 41.
[9] Internal Revenue Code section 41(c)(5).
[10] *See* Protecting Americans from Tax Hikes Act of 2015, Pub. L. No. 114-113 § 121.
[11] *See* Gravelle, *supra* n. 3.

C. Alternative Innovation Tax Incentive Proposals

1. Implement an innovation box

The term "innovation box" (a.k.a. patent box, knowledge box, etc.) refers to a tax mechanism that provides favorable tax treatment for income related to intellectual property. Many have, for some time now, proposed adding an innovation box as part of U.S. tax reform. Several countries already have an innovation box regime (e.g., U.K., France, and Netherlands). Supporters say an innovation box would:[12] 1) provide an incentive for both U.S. and foreign companies to locate their intellectual property (IP) in the U.S., especially in light of the Base Erosion and Profit Shifting (BEPS) project's focus on nexus (discussed below); 2) encourage more R&D and related jobs in the U.S.; 3) discourage mobile IP income flight from the U.S. due to U.S. high corporate tax; and 4) "back-end" successful outcomes rather than covering "front-end" costs as under the R&E expensing and credit.

In considering a potential U.S. innovation box regime, consider the Organisation for Economic Cooperation and Development (OECD) BEPS project "Action #5" proposal. In this proposal, the OECD recommends that member countries adopt a "nexus" approach in designing or modifying their IP incentive regime. Under the "nexus" approach, the IP owners must demonstrate nexus, i.e., that substantial innovation activity occurs in a specific country, as a condition for qualifying for that country's IP incentive regime. Supporters for a U.S. innovation box worry that this BEPS proposal may incentivize U.S. companies to move their R&D jobs overseas in order to be entitled to benefits provided by other countries' IP incentive regimes.

Other commentators state that the proposed innovation box regime is unlikely to be effective in incentivizing R&D or discouraging the shifting of U.S. profits to low-tax foreign jurisdictions, at least in its current, net profit-based form.[13] Commentators believe this because: 1) if a company shifts additional R&D to the U.S., the income to such R&D unit (for its R&D services) would be taxed at a relatively high tax rate (as the § 41 credit and § 174 expensing would be eliminated); and 2) there is little incentive for a company to enter a U.S. innovation box if its IP profits are already shifted to a low (or zero) tax rate country. In fact,

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[12] Jt. Econ. Comm. "Patent Boxes: A Brief History, Recent Developments, and Necessary Considerations" (March 10, 2016).

[13] *See* Gravelle, *supra* n. 3. The Innovation Promotion Act of 2015, sponsored by Reps. Chas. Boustany (R-La.) and Richard Neal (D-Mass.), would allow a corporation to deduct 71 percent of the lesser of (i) innovation box profits derived from qualifying IP or (ii) taxable income (determined without the 71 percent deduction), thus translating into an effective tax rate of approximately 10 percent on all innovation box profits. This innovation box's base would be on *net profits*, while other regimes may focus on different bases (e.g., gross profits).

when there is an arm's-length cost sharing arrangement between a U.S. company and its foreign subsidiary, a patent box based on net profit (a net income box) is likely to discourage investment in the U.S. This is because R&D costs are currently deducted or credited for an effective negative 10 percent tax rate, with IP-based profits then shifted to a foreign country taxed at a low rate; under the innovation box, U.S. R&D costs would be taxed at around a 35 percent tax rate, with an additional tax of about 10 percent on IP-based profits under the innovation box regime. Commentators conclude that the R&E credit is more effective than an innovation box applied to net profit.

Dr. Jason Furman, the chairman of the White House Council of Economic Advisers, compared the innovation box to expanding the R&E credit, and concluded that expanding the R&E credit is a better approach in five respects.[14] First, the R&E credit better addresses the underlying positive externality where the social benefit from investment in research may not be proportional to its anticipated commercial potential. Some innovation activities that generate high social benefits may be underinvested under the innovation box regime because they are not easy to commercialize. Second, the "front-end" R&E credit is proportional to the amount of research while the "back-end" innovation box is proportional to the return. Therefore, the innovation box may reward innovation that is the result of luck, market power, or other similar factors. It would thus create windfall gains for the business and potential large costs to tax revenue. Third, the R&E credit focuses on new research, while the innovation box, if structured improperly, may create windfall gains on research already done and IP that already exists. Fourth, the R&E credit can improve businesses' cash flow while an innovation box does not. Fifth, and lastly, the innovation box could be more administratively challenging than the R&E credit partly because it is difficult to define what income comes from IP. Such difficulties might lead to increased resources being devoted to tax planning and justifications instead of innovation activities.

Other common criticisms of an innovation box include the following:[15] First, the revenue used to create an innovation box might be better directed toward lowering general taxes to benefit all businesses. Second, IP-driven companies already benefit from the R&E tax credit when developing their IP, and if the R&E credit is not effective enough, the proper solution is to improve the R&E credit policy. Third, there is little research to support the proposition that the innovation box is effective in achieving in its goals. Fourth, the innovation box may encourage businesses to misreport other income as IP income and therefore defeat the purpose (like what has happened to the Internal Revenue Code section 199 manufacturing deduction). Fifth, the proposed innovation box would not be available to individual

[14] *See* Furman, *supra* n. 1.
[15] *See* Jt. Econ. Comm. *supra* n. 16.

or pass-through businesses in its current form, causing distortion in choice of entity. Sixth, the innovation box regime may provide significant tax relief to income earned by multinational enterprises engaging in certain tax planning while disfavoring small- and medium-sized enterprises (SMEs).[16] And seventh, the innovation box is an income incentive for already-profitable firms that least need the tax assistance.[17]

Other commentators state that IP box regimes are often not cost-effective in promoting innovation and may simply be part of an aggressive tax competition strategy between countries.[18]

To summarize, many of the concerns on the effectiveness of a U.S. innovation box relate to its design, such as whether it applies to net profit or gross investment; the breadth of its coverage; and whether to restrict the benefit to innovation developed in the U.S. and the derivative products *produced* in the U.S., which may be partly addressed by proper structuring of the innovation box regime.[19] The other part of the concern is whether the innovation box is superior to the other approaches for incentivizing R&D, discussed throughout the rest of this paper.

[16] *See* Modica & Neubig, *supra* n. 6.
[17] *Id.*
[18] *See* IMF, *supra* n. 4.
[19] *See* Jt. Econ. Comm. *supra* n. 16.

Atkinson's and Andes's Summary of Patent Box Issues[20]

An overview of the recent emergence of patent boxes:

- Patent boxes differ from R&D tax credits in that the former incentivize firms to commercialize innovations (instead of simply conduct research), which promotes economic growth, competiveness and job creation.
- In recent years a number of countries have established a patent box regime. But the established patent boxes differ among nations with respect to: 1) the definition of the qualifying profits; 2) how acquired IP is treated (most nations allow acquired IP to qualify); 3) the patent box tax rate; and 4) caps on the total tax relief companies can receive from patent boxes.

Why nations adopt patent box regimes:

- Tax incentives can help to correct multiple market failures.
- The process of innovation is now much more global and mobile.

Effectiveness of patent boxes:

- Data show patent boxes do induce firms to patent more in the nations with patent boxes. However, the increased IP income does not fully offset revenue loss caused by lower tax rate.

Patent boxes would be more effective if:

- jurisdictions with patent boxes required R&D and/or production associated with qualifying IP to be performed in-country to qualify for the full patent box rate.

A well-designed patent box regime can help the U.S. to promote R&D and commercialization and keep up with the global innovation race:

- A patent box reduces the financial risk involved in innovation, better matching firm rewards with societal benefits, including the creation of high-wage jobs.
- A patent box would lower the effective corporate tax rate for knowledge-based establishments located in the U.S., making it easier for them to compete against establishments in nations providing robust innovation incentives.
- However, there are three key issues in the design of the U.S. patent box:
  - The rate.
  - The connection between the lower rate and the conduct of R&D research and production of innovation products domestically.
  - Whether to allow firms that have applied for a patent but not yet received it to take partial patent box tax benefit.

[20] Rob't Atkinson & Scott Andes, "Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation," Info. Tech. & Innovation Found. (Oct. 2011).

2. Expand and simplify the R&E credit

The President's Framework for Business Tax Reform proposes to simplify the R&E credit that currently takes business's outdated research expenses into account, to increase the credit rate from 14 to 18 percent, and to enhance the credit for pass-through businesses.[21]

3. Reform international taxation[22]

Due to the mobile nature of IP, IP tax planning and international tax planning strongly overlap. Much of IP tax planning revolves around moving IP from high-tax countries (where the IP is often made) to low-tax countries. Thus, reform of international tax planning would strongly impact IP taxation.

The Obama administration proposes to reform the international tax system primarily through making it harder to escape the U.S. tax system, while adding some favorable reasons for staying. These changes include the following:

- Instituting a 19 percent minimum tax on foreign earnings;
- Imposing a one-time tax on repatriated earnings;
- Limiting inversions;
- Granting tax incentives for locating jobs and business activity in the U.S. coupled with removing tax deductions for shipping jobs overseas; and
- Closing loopholes under subpart F (i.e. creating a new category of subpart F income for transactions involving digital goods or services, and expanding foreign base company sales income to include manufacturing service arrangements).

Others argue that moving to a territorial tax system would be more effective to foster innovation and prevent the flight of IP abroad,[23] as this would make the U.S. tax system theoretically more competitive with foreign tax systems.

4. Capitalize intellectual capital

Contrary to the general belief of the necessity of subsidizing R&D, Prof. Kahng proposes reforming the tax law to require businesses to capitalize and amortize a broad range of intellectual property over a five-year period.[24] She

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[21] White House and Department of the Treasury, "The President's Framework for Business Tax Reform: An Update" (April 2016) https://www.treasury.gov/resource-center/tax-policy/Documents/The-Presidents-Framework-for-Business-Tax-Reform-An-Update-04-04-2016.pdf.
[22] *Id.*
[23] Curtis S. Dubay, "An Innovation Box for the U.S.? Congress Should Focus on Business Tax Reform Instead," Heritage Found. (2015) http://www.heritage.org/research/reports/2015/08/an-innovation-box-for-the-us-congress-should-focus-on-business-tax-reform-instead.
[24] Lily Kahng, "The Taxation of Intellectual Capital," 66 FLA. L. REV. 2229 (2014) http://digitalcommons.law.seattleu.edu/cgi/viewcontent.cgi?article=1488&context=faculty.

believes taxpayers should be forced to capitalize intellectual capital not only when it is acquired from third parties (under Internal Revenue Code sections 197 and 167), but also when the intellectual capital is self-created. Prof. Kahng argues that the proposal will reduce substantial revenue losses and serious misallocation of resources. As part of business tax reform to lower corporate tax rates through base broadening, the Chairman of the House Ways and Means Committee recently also proposed that R&D expenditures be capitalized and depreciated straight-line over five years.[25]

Other commentators note that the current tax rules generally favor internally-developed KBC partly for administrative simplicity.[26] Internally-developed KBC is expensed while acquired KBC is capitalized and will be depreciated over the life of the assets. In addition, the sale of KBC generally triggers a taxable gain for the seller, which often is not matched by an offsetting immediate deduction of the purchaser, so tax on the value of the KBC is accelerated. Commentators believe the differing treatment disadvantages many SMEs and start-ups that don't have the capacity to both innovate on and manufacture finished products, but rather only innovate. In addition, the different treatment may provide an incentive to internally develop KBC, even when purchasing from a third party would be more economically efficient. Commentators believe countries that have the same depreciation rules for internally-developed and externally developed KBC can reduce this tax distortion. However, some distortions will remain because of the capital tax imposed on the sale of KBC.

5. Do not specifically tailor tax rules to promote innovation

Prof. Hasen shares the belief that the existing tax rules for innovation generally are inappropriate.[27] He lists three principles to support this belief: First, the goals of fairness, efficiency, etc. are not a proper focus of sector-oriented reform; second, correcting an externality does not necessarily lead to net improvements if the method of correction requires the introduction of distortions into other parts of the system; and third, the special tax rules geared toward stimulating innovation (such as Internal Revenue Code sections 41 and174) suffer a unique structural handicap relative to other possible regimes, because they do not address the basic circumstances leading to market failure for innovation. Prof. Hasen contends that innovation tax incentives will bring more distortion to the innovation sector and promote excessive risk-taking.

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[25] *See* Modica & Neubig, *supra* n. 6.
[26] *Id.*
[27] David Hasen, "Taxation and Innovation: A Sectorial Approach," UNIV. ILL. L. REV. (forthcoming) http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2746681.

D. Innovation Tax Incentives as Compared with Other Incentives to Innovate

Profs. Hemel & Ouellette develop a framework of innovation policies that allows direct comparisons among the four main incentive mechanisms: patents, prizes, grants, and tax incentives.[28] They argue that the optimal innovation policy will depend on a range of factors that are likely to vary across contexts, and provide a pluralistic approach to incorporate each of the mechanism in various contexts.

First, Profs. Hemel & Ouellette discuss the current approaches to encouraging innovation. They argue that under various stylized assumptions, each mechanism (patents, prizes, grants and tax incentives) leads to the same set of research projects being pursued at the same social cost in theory. However, the claim that patents, prizes, grants and tax incentives are equally effective at the same budgetary cost is subject to numerous caveats. They also provide an overview of how each mechanism is implemented in the U.S. in practice.

Second, Profs. Hemel & Ouellette compare innovation incentives mechanisms on three dimensions: 1) who decides the size of the reward that innovators will receive and how much to reward them; 2) when the reward will be provided; and 3) who will pay the corresponding cost. With respect to each of these dimensions, innovation incentive mechanisms fall onto a spectrum rather than into discrete boxes.

With respect to who decides the size of the reward, there are either government-set rewards, such as grants and fixed prizes, or market-set rewards, such as the patent system. Government-set rewards are inefficient when the government has a comparative disadvantage relative to private sector to evaluate the projects' costs and benefits, and could also raise the risks of politicization, rent-seeking, and mismanagement. In contrast, market-set rewards are based on supply and demand. R&D tax credits and patent box regimes can reproduce many of the merits of a patent system under conditions of asymmetric information.

With respect to when the reward will be provided, there are either ex-ante rewards such as grants and R&D tax incentives or ex-post rewards such as prizes, patents and patent boxes. The choice between ex-ante and ex-post rewards depends on circumstances. The following considerations implicate the choice: 1) capital constraints and capital friction, where the ex-ante reward mechanisms reduce the need for start-ups to rely on external financing for new research contracts; 2) optimism bias and risk aversion; 3) differing discount rates – if one believes that the social discount rate is lower than the private discount rate, grants and credits

[28] Dan'l Hemel & Lisa Ouellette, *Beyond the Patents–Prize Debate*, 92 TEX. L. REV. 303 (2013).

(transfer now) will be more efficient than prizes and patents (transfer later); and 4) distribution among innovation producers.

With respect to who will pay the corresponding cost, either the user pays the cost or the cost is cross-subsidized by the general public. The choice between cross-subsidization versus user-pays has distributive implications and also has an efficiency dimension.

In addition, there are several further considerations beyond the three dimensions, which will implicate the choice among innovation policies, including the following. 1) Nonmonetary motivations — even though the importance of social-psychology is not clear or uniform, it is generally accepted that monetary rewards for innovation are likely to be more attractive when they are complemented by nonmonetary motivations. 2) Disclosure of technical information – different innovation incentives also vary respect to how much information an inventor must to disclose as a condition for the reward. Disclosure is universally required for patents while the degree and transaction costs of information exchange involving other innovation incentives depend on circumstances. 3) Racing among multiple innovators – where inefficient racing is a concern, well-designed ex-ante rewards can eliminate the problem. 4) Administrative costs – this includes costs of establishing the legal regime, evaluating the projects, and policing the system.

Third, Profs. Hemel & Ouellette apply the framework they have established to specific circumstances and argue that alternatives to the patent system (prizes, grants, and tax credits) alone or in combination are more effective than the status quo patent system in these circumstances. They argue that although international treaties and domestic political configurations (the patent rewards are "off-budget" costs) impose obstacles to reform, the obstacles are not insurmountable.

They suggest that government grants are most effective when the government has a comparative advantage relative to private sector in evaluating the costs and benefits of the projects and where market signals are poor proxies for the social benefits of the projects, where potential innovators encounter significant capital constraint, and where cross-subsidization is desirable. Thus, grants would be ideal for space exploration.

Government-sponsored prizes are most effective when government is able to set a clear goal and appropriate prize size, where the innovation did not require significant capital investment, and where financing the prize will not entail cross-subsidization. A perfect example would be a mathematical or algorithmic challenge.

Patents are most effective where potential innovators have ready access to capital and negative effects of risk aversion are limited, where government cannot properly evaluate projects, and where a user-pays feature is preferable. Patents

would excel for incentivizing innovation of "lifestyle" drugs such Viagra or baldness treatments. Patents might also be optimal in technology fields populated by start-ups.

Tax incentives are most effective when the government cannot properly evaluate projects and where market signals are reliable proxies for projects' social benefits. The tax incentives might also be optimal when innovators face high risk of failure and are constraint by capital, where transaction costs for a patent system are high. A perfect example would be battery technology innovations.

In the end, Profs. Hemel & Ouellette argue that patents, prizes, grants and tax incentives all play a role in efforts to encourage research and development.