# Measuring Payments for the Supply and Use of Intellectual Property

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ABSTRACT

The market for the licensing of Intellectual Property and other intangibles is growing rapidly in the United States. At the same time there is increasing interest in the value of these intangible assets and their impact on economic growth, productivity, and competitiveness. Despite this interest there are large gaps in the available data to track and evaluate the impact of intangibles on the economy. This paper presents both aggregate and industrial sector specific estimates of receipts of royalties and license fees within a national accounts framework. These estimates and this framework can be used to better assess the macroeconomic impact of intangibles and to trace the flows and impacts across industries. The estimates may also be used to develop measures of the market value of the underlying intangible assets. This paper uses previously unpublished estimates of BEA International Services trade data for royalty and licensing fees by industry sector to improve the current output measures for domestic producers of intellectual property by estimating the share of royalty income earned by different types of intangible assets for 2002. These assets are patents and trade secrets, copyrights, trademarks, and franchised business formats. The estimates show that U.S. receipts for the use of these intellectual property assets totaled approximately $100 billion dollars in 2002; this compares with rental and leasing receipts for automobiles, machinery, computers, and other equipment of $95.1 billion dollars in 2002.

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## I. Introduction

For economists and policymakers interested in understanding the role of intangibles and intellectual property in international trade and in the domestic economy, developing a clear set of metrics is one of the first steps. In a recent paper, Corrado, Hulten, and Sichel (2005) estimate that business investment in intangible capital is as large as business investment in tangible capital, approximately $1 trillion dollars per year or about 10 percent of GDP.[1] This paper presents estimates showing that U.S. receipts for the use of the intellectual property component of intangible capital totaled more that $100 billion dollars in 2002; this compares with rental and leasing receipts for automobiles, machinery, computers, and other equipment of $95.1 billion dollars in 2002. Thus the income received by owners of intellectual property assets in lessor-type transactions is comparable to the income received by owners of a large component of tangible assets in similar transactions.

As BEA and national accountants in other countries wish to develop methodologies to incorporate R&D as an intangible asset into their accounts, market-based information on the value of intangible assets and measurement of payments and receipts for their use become increasingly important. However, existing survey data are limited. Although these transactions appear in BEA's GDP by industry and in the Input-Output (I-O) accounts, in the past this data gap had little impact on Gross Domestic

[1] The scope of this estimate of intangible capital is broader than just IP. It includes firm-specific human and organizational resources in addition to trademarks, brand names, patents, copyrights, software, and databases.

Product (GDP) because most spending on intangibles and intellectual property has been considered intermediate services.[2] Thus business expenditures only appear a) as inputs to the value of final goods and services or b) in exports and imports of services, where BEA collects survey data on international service transactions, including R&D services as well as payments and receipts of royalties and licensing fees. When intangibles are treated as investment instead of as intermediate services, then these business expenditures become part of the investment component of GDP. The goal of this paper is to provide a commodity framework that separates the purchase of intangible assets from service flows resulting from their use, and use this framework to develop preliminary estimates for a series of IP-licensing transactions that are not separately reported in existing statistical data for large parts of the domestic economy.

Since many intangibles are not sold in market transactions, there is limited opportunity to develop market-based price data that could value these intangibles directly. With the exception of the comprehensive expenditure data on R&D available from the National Science Foundation, there is also limited information on expenditures for the creation of intangibles. In U.S. Census-reported data, most of these costs of creation and purchase are bundled together with other business receipts and expenses. However, there are observable transactions for the use of technology, patents, trade secrets, trademarks, copyrights, and franchises in the form of royalties and licensing fees. These are direct, market-based transactions for which data can be collected and analyzed.

Further, based on available evidence, payments and receipts for the use of intellectual property (IP) through royalties and licensing fees are substantial and growing rapidly. Internal Revenue Service data from corporate income tax returns indicate that

[2] BEA recognized software as investment in 1999.

U.S. corporations received $115.8 billion in royalty receipts in 2002 (IRS (2005)); this amount has grown at an average rate of over 11% per year since 1994.

Information about the industries that receive this income by selling the use of IP is only available for a limited number of industries in Economic Census data, and data about the licensing of technology by manufacturing industries are particularly scarce. As a result, BEA makes estimates for this activity in its Input-Output Accounts based on corporate income data from IRS, instead of on output-based measures such as Economic Census data.

The most detailed set of data available on these types of transactions is collected by BEA -- international payments and receipts of royalties and licensing fees between unaffiliated parties.[3] These international data show the substantial role of U.S. firms in technology services trade. International transactions for the use of patents, trade secrets, and industrial processes can be used to trace both the international and inter-industry structure of technology diffusion, and as a basis for estimating domestic use of intangibles.

This paper has three parts: first, a description of BEA international data on royalties and licensing fees. Second, the paper describes set of service commodities that can be used to provide a framework to measure the use of IP—that is, a way to measure the market-based component of service flow for intangible assets. Third, the paper describes how international transactions can be used to develop an approximation of domestic receipts for the use of intangibles by type of IP—an area where existing data is incomplete. The results of this approximation indicate this imprecisely measured

[3] BEA also collects data on royalty and licensing fee transactions between affiliated parties, but these data are not further broken down by type of intangible asset.

economic activity includes a large and dynamic component of the knowledge economy. Industry receipts for the use of patented technologies, trade secrets and formulas were over $60 billion dollars in 2002. The commodity framework described for IP-related products provides the basis to improve both existing survey data and the developing measures of technology and innovation.

In addition to their value to BEA's industry accounts, these measures can be used to inform the R&D satellite accounts. Existing alongside without changing BEA's core accounts, these R&D satellite accounts describe the impact on GDP and other macroeconomic variables of recognizing R&D as investment. While the 2006 R&D satellite account presents aggregate estimates of business investment in R&D, future versions will provide increasing levels of industry detail on supply, use, and capital flows of R&D.

As BEA continues to improve its methods for estimating the output price or value of R&D in its R&D satellite accounts, these IP-licensing estimates based on royalties and licensing fees will provide a valuable alternative to existing cost-based measures. Absent data on the income received for the use of R&D, R&D's value is often measured based on estimates of the cost of production or based on the difference between market capitalization and the value of tangible assets. Improved data on royalties and licensing would allow the value of R&D to be estimated using a discounted value of the royalties that could be earned over the life of an R&D asset.

In addition to their use in estimating the value of R&D, IP-licensing commodities will also form an important component of future satellite accounts that present the industry dimensions of R&D in an I-O framework. Royalty and licensing payments for

the use of industrial processes and trade secrets provide measures of the use of R&D assets in economy. These data on use will accompany measures of 1) the supply of R&D investment from producing industries and 2) the flow of R&D investment to industries as purchased or internally-created capital.

**Overview of Results**

The main results of this paper are a set of estimates unavailable elsewhere for the receipts by U.S. industrial sectors for four types of IP-related service commodities. These service commodities are the licensing of rights to use 1) patents, formulas, and trade secrets, otherwise known as industrial processes; 2) IP protected with trademarks, 3) IP protected with copyrights, and 4) franchised business formats. Presented as preliminary approximations, these estimates are based on Census data where available, supplemented with franchise industry royalty estimates. For the remainder of the industries, IRS-based royalties were spread across the types of IP using the ratios from BEA international receipts for the purchase and use of intangibles based on the assumption that domestic demand for the licensing of U.S. intellectual property has a similar structure to international demand for U.S. intellectual property. The largest subcomponent of these royalty payments is industrial process licensing receipts. For U.S. corporations, these receipts are in a range between $60 and $67 billion dollars in 2002, and that the majority of this sum, between $50 and $60 billion dollars, was received by manufacturing firms. U.S. corporate licensing receipts for the use of four types of intellectual property -- industrial processes, trademarks, copyrights, and franchises are estimated to be between $105 and $115 billion dollars in 2002. For an order of

magnitude comparison, Census receipts for rental and leasing services from establishments with employees, including rental of automobiles, machinery, computers, and other equipment was $95.1 billion dollars in 2002.

## II. International Transactions Data on Technology, Innovation, and the Use of Intellectual Property

### A. BEA International Royalties Data

For the United States, international transactions in royalties and license fees are an important part of technology trade in services. BEA collects data on affiliated transactions, those conducted between multinational parent firms and their subsidiaries in a different country and on unaffiliated transactions, those conducted between unrelated parties in different countries. In 2002, royalties and licensing fees made up about 16 percent of the value of exports for total private services, and about 9 percent of the imports. However, for affiliated trade, these ratios rise to 44 percent for exports and 33 percent for imports.

The largest share of service trade reflected by royalties and license fees is between the U.S. and other developed countries; this is true for both affiliated and unaffiliated trade (table 1). However, the inclusion of Bermuda as a location receiving a large volume of payments in affiliated transactions is illustrative of the tax-related distortions in the affiliated trade data described at the International Service Flows conference by Bob Lipsey and by John Mutti.[4]

Mutti and Grubert (2006) describe the use of hybrid entities by multinational corporations to move their intellectual property to other countries in order to lower their overall tax liabilities. A firm that anticipates future royalties from an R&D activity can

[4] NBER-CRIW Joint Conference on International Service Flows, April 28-29, 2006

set up a cost-sharing agreement with a foreign subsidiary, whereby the foreign subsidiary can buy a stake in a patent before it generates income. The subsidiary earns profits from the use of intellectual property in a low-tax location, while royalties and licensing fees, which are deductible from the firm's tax liabilities, are paid in a high tax location.

As Lipsey points out, the location of intangibles is particularly susceptible to the kinds of manipulation that lead to distortions in service trade data. Lipsey's table 11 illustrates the very high ratio of capital income to labor for Bermuda (13.007), compared to an average for Europe of 0.439. Bermuda is one of these tax havens with no corporate income tax (Fernandez and Shestul). For royalties and licensing fees, evidence for this distortion in service trade data is seen in the magnitude of royalty payments to low tax locations like Bermuda in the affiliated transactions.

Royalties and licensing fees are paid for the use of several types of intangibles. While the majority of royalty and licensing transactions are between multinational corporations and their affiliates, the smaller component of the transactions, trade between unaffiliated parties, can be analyzed by type of intangible (table 2).

While the breakdown by type of IP is not currently available for affiliated transactions, BEA plans to add this detail to future surveys. However, BEA's *1989 Benchmark Survey of U.S. Direct Investment Abroad* does provide a breakdown for receipts and payments between U.S. parents and their foreign affiliates.[5] In 1989, 88.5 percent of the receipts from foreign affiliates to U.S. parents were for the use of industrial processes (patents, formulas, and trade secrets). In that same year the share for receipts from unaffiliated transactions was substantially lower, 68.1 percent. These unaffiliated

[5] Table I.X.I. These ratios are not directly comparable to current data because the large category of general use computer software was not part of the estimates in 1989.

transactions are "arm's length," and therefore less likely to be distorted by differences in international tax treatments that may provide an incentive for firms to move IP to other countries.

In 2002, transactions between unaffiliated parties are dominated by receipts for the use of industrial processes, and for general use software. On the purchase side, the unaffiliated transactions are also dominated by payments for the use of industrial technology, followed by payments for broadcasting and recording of live events, while payments for general use software come in a distant third.

The data in Table 2 representing transactions between unaffiliated parties are particularly valuable for understanding the commodity and industry structure of the use of IP since these data are collected by industry of transactor as well as type of intangible. For the analysis in this paper, underlying data from the mandatory, confidential *Annual Survey of Royalties, License Fees, and Other Receipts and Payments for Intangible Rights between U.S. and Unaffiliated Foreign Persons* (BE-93) were analyzed by the author under an agreement with BEA's International Investment Division not to disclose respondent specific information. Tables 3 and 4 below provide a previously unpublished summary of the industry distributions of unaffiliated payments and receipts prepared by BEA's International Investment Division for 2002. To insure confidentiality, intangibles are divided into only two components, royalty and licensing fees for industrial processes and royalty and licensing fees for all other intangibles. The observations below are based on analysis of the underlying data.

The sector collecting the largest amount of royalty receipts is information and the majority of these royalties are for general use software. The information sector also

collects a substantial share of its receipts for industrial processes. The manufacturing sector receives $2.8 billion, or about three quarters of its $3.6 billion in unaffiliated international receipts for industrial processes. Within professional, scientific, and technical industries, a little less than half of the receipts are for general use software, and more than a quarter is for industrial processes. The industry within the sector receiving the largest share of industrial process royalties is the Scientific Research and Development industry (NAICS 5417), followed by Architectural, Engineering, and Related Services (NAICS 5413).

While information industries receive a large share of the unaffiliated royalty receipts, the substantially smaller volume of unaffiliated international royalty payments for intangibles is predominantly paid out by manufacturing industries (Table 4). This sector paid out in 2002 $2.9 billion of the total of about $4 billion, with 61% of that going for industrial processes. The majority of these payments are reported by firms in the pharmaceutical industry. Although overall for unaffiliated transactions U.S. firms receive substantially higher royalty receipts from foreign parties than they pay out, for the pharmaceutical industry this pattern is reversed. U.S. pharmaceutical firms make substantially higher payments to foreign parties for industrial processes than they receive from unaffiliated foreign parties.

## III. Linking Transactions for Intellectual Property to Service Commodities

## A. Intangible Assets and Payments for their Use in the National Accounts

Business spending on intangibles, expenditures that are not connected to a physical or financial embodiment, constitute investment when the purpose of the expenditure is to increase future output. These expenditures cumulate into a stock of intangibles that become intellectual property when a legal authority provides the owner with the exclusive right to benefit from its use. Thus IP is a subset of intangible assets that includes artistic creations, technological innovations, scientific discoveries, and reputation or brand-related constructs like trademarks. In addition to expenditures for the creation of intangibles, businesses also provide or license these intangible to others to use without relinquishing all of the ownership rights.

While payments for the use of these intangibles and intellectual property could be considered property income, national accounting conventions consider these payments, commonly called royalties, as payments for a service and thus as part of economic output (CEC (1993) Annex 1, paragraph 69). This means that there are two types of economic output to measure for intangibles, the investment itself and the service that the cumulative stock of intangible investment provides when it is used in production. Economic transactions for intangibles that are not part of current production would also include the purchase of existing intangible assets, such as the purchase of a patent from its owner.

## B. Identifying IP-related Commodities

As described above, payments for the use of intangible assets are transactions for the purchase of a service commodity. Improving the current estimates for the payments and use of IP requires a way to separate out related transactions, such as the contract

production of IP, purchases of IP assets, and commodities with IP embedded in them. A recent North American Product Classification System (NAPCS) discussion paper by Mohr and Murphy (2004) of the Census Bureau provides an example of a readily available, detailed framework for identifying IP-related commodities based on their use. Their production-based approach proposes a treatment of IP-related assets that is generally consistent with the System of National Accounts, the set of international guidelines for national economic accounts.

Mohr and Murphy identify three basic types of IP-related products: 1) Contract Production of IP assets, 2) Speculative Production of IP asset, and 3) Leasing and subleasing for economic use. A fourth IP-related commodity is a good with IP embedded in it, for example a computer.

**Examples of Receipts for Different Types of IP-Related Transactions**

| | IP protected by patent or trade Secret as an industrial process | IP protected by copyright |
|---|---|---|
| Contract production of IP | R&D to improve an industrial process | Writing a theme song under contract |
| IP assets | Sale of a patented industrial process and all future rights | Sale of a copyrighted song and all future rights |
| **Licensing of IP Assets** | **Receipts for licensing a patented industrial process for use in production** | **Receipts for licensing the right to use a musical score in commercial advertising** |
| IP-Derived Products | Receipts for products produced with IP—example chemicals | Receipt for purchase of a recording of the soundtrack |

The table above provides some examples of the different types of transactions that apply to two types of IP, industrial processes that may be protected by patent or trade secret, and creative work protected by copyright. [6] The line of the table above in bold typeface presents the type of IP-related transactions that can be identified as receipts in

[6] Similar columns and examples could be created for IP protected by trademarks and for franchise-related transactions. Since this table describes economic transactions, it leaves out an important activity – creation of own-account IP assets. This activity is economic production when the IP is also considered to be a produced intangible asset, for example the current treatment of software in the U.S. national accounts.

the form of royalties and license fees. Contract production of IP is a service commodity, with the purchaser usually gaining the rights to the IP. Speculative production of IP involves creation without a pre-existing contract for sale. Licensing of rights to use IP-assets involves the use of IP in further production without relinquishing ownership rights to the IP. The last category is for commodities that have IP-embedded in them; in this case the right to reproduce the IP for further sale is not part of the transaction. End-use licensing of software is in this final category.[7]

Applying Mohr and Murphy's transactions to different types of IP allows a set of service commodities reflecting the use of IP in production to be identified:

1) Licensing of rights to use IP protected an industrial process (including patents and trade secrets)
2) Licensing of rights to use IP protected by trademarks
3) Licensing of rights to use IP protected by copyright
4) Licensing of rights to use a business format under a franchise

These four commodities are referred to as IP-licensing service commodities in this paper. Contract production of IP, speculative production of IP, final use products and the four IP-licensing service commodities form a structure that can be used to improve the current estimates of transactions for the use of IP and develop improved survey measures.[8]

[7] Computer software is an intangible that can be patented, copyrighted, and licensed, when it is mass produced and shrink-wrapped, BEA considers it a good. Software licenses are not generally the same type of transaction as the payments for the use of assets described above. Rights to software take two basic forms, the right to its use and the right to its reproduction. Payment for the right to use software with a useful life of a year or more without the additional right to reproduce it is considered the purchase of a fixed capital asset; in this case the asset is the copy of the original. On the other hand, payment for the right to reproduce software, for example to enhance it in some way and re-license it to an end user is a different kind of production activity. It is payment for the services of the software original (Lequiller, et. al (2002)). The first type, licensing for end use is a final expenditure, while the second type, licensing for reproduction, is payment for the use of an asset.

[8] This product structure is currently reflected in some of the survey forms collected by Census in the Economic Census and the Service Annual Survey. For the 2002 Economic Census, licensing-related payments are specifically collected for establishments in the information sector and the arts, entertainment

The remainder of this paper describes how using this commodity framework would improve BEA's estimates of inter-industry technology flows in its Input-Output accounts and how existing data from international transactions for royalties and licensing fees can be used to improve the current measurement of the output of one of the main producers of IP services.

## IV. Domestic Transactions for the Use of Technology and other forms of Intellectual Property

BEA's benchmark Input-Output (I-O) accounts provide the most detailed view available of the technological structure of the United States economy. With improved source data it can become a powerful tool to trace the flow of the IP-licensing commodities from their suppliers to their users. In the I-O accounts, suppliers and users of commodities are classified into industries based on establishments rather than enterprises. The Make Table shows the production of commodities by industry and the Use Table shows where commodities end up in the production process—they appear either as intermediate inputs to industry, or as components of final demand.

For commodities that are physical goods, and for many service commodities, Economic Census data provide detailed information on receipts for the products each industry produces. For IP-licensing service commodities however, this information is limited to just a few industries. In contrast with the BEA data on international service

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and recreation sector, and for establishments in two specific industries, Lessors of Non-financial Intangible Assets (NAICS 533) and Management of Enterprises (NAICS 551). Census's Service Annual Survey (SAS), which is collected on a company basis and thus combines the activity of all the domestic locations of the enterprise, also has licensing-related receipt questions for firms in the information sector. These questions have also been included on the SAS form for scientific research and development services industry (NAICS 5417). For the product questions on NAICS 5417 form, the important product distinction is made between payments for licensing the right to use intellectual property and payments for new intellectual property works produced without contract for sale. This distinction separates the creation of IP from payments for its use. These service products are further distinguished from research and development activities produced for sale under contract; in the latter case the intellectual property rights are usually conveyed to the purchaser.

transactions, which showed receipts and payments for the use of IP from many sectors of the economy, including a large component to manufacturing, Economic Census data focuses its IP-service measurement primarily on the information sector, entertainment, and on a peculiarly titled but important industry, Lessors of Non-financial Assets, Excluding Copyrights.

**Lessors of Non-financial Intangible Assets and the I-O Accounts.**

Although intangible assets are created throughout the economy and many industries receive licensing payments for their use, for one industry this activity is primary—Lessors of Non-financial Assets (excluding copyrights)—NAICS 533.[9] This industry rents intangibles and intellectual property such as patents, trademarks, brand names, and franchise agreements. One example of a firm in this industry comes from a review of publicly available Securities and Exchange Commission filings. Competitive Technologies of Fairfield, Connecticut describes itself as a full service technology transfer and licensing provider, representing technologies invented by corporations, individuals, and universities. Its income is mainly derived from license and royalty fees. The firm also gains some of its income as shares of royalty legal awards that result from litigation.[10] It is this latter activity that has earned firms in this industry their characterization as "patent trolls."

[9] Establishments within this industry sub-sector are primarily engaged in assigning rights to assets such as patents, trademarks, brand names, and/or franchise agreements for which a royalty payment or licensing fee is paid to the asset holder. Establishments in this sub-sector own the patents, trademarks, and/or franchise agreements that they allow others to use or reproduce for a fee and may or may not have created those assets.

[10] The 10-Q filing for Competitive Technologies, Inc is found at http://www.sec.gov/edgar/searchedgar/webusers.htm.

For Lessors of Non-financial Assets (Excluding Copyrights), the primary output of the industry is IP-licensing service commodities—the provision of patents, trademarks, brand names and/or franchise agreements in exchange for a royalty or licensing fee. Licensing of rights to use IP protected by copyright, as well as the end use licensing component of software, would be excluded. For this industry, BEA's Input-Output accounts currently use source data that provide reasonable totals for the overall corporate receipts of royalties. However, the aggregate nature of the data makes it difficult to properly estimate output by establishment-based industry and by the IP-licensing commodities that the industry produces.[11] This limitation obscures the increasingly important part of economic production represented by the licensing of technology and other forms of IP.

Statistical data for IP-licensing from the Economic Census and from BEA International Transactions data are compared with an additional source, administrative records data from IRS, in table 5. As the table notes, the scope of covered IP differs somewhat for each source, but the differences in the reported receipts are striking. While BEA data report $44.5 billion dollars in receipts by U.S. firms from foreigners, both affiliated and unaffiliated, Census data, which would include both receipts for exports and for domestic transactions, report just $24 billion dollars. A third source, administrative records data from the IRS based on corporate income tax returns, reports royalty income of $115.9 billion dollars for U.S. firms. These different data sources and

[11] A methodological issue related to the conversion of classification systems from SIC to NAICS posed the following challenge. The old SIC industry, 6794, Patent Owners and Lessors, included copyright buying and selling in addition to other types of intangibles. The new NAICS industry excludes copyrights, since they are sold and leased primarily in the information sector. The kind of analysis summarized in this paper is required in order to improve the estimates for the upcoming 2002 Benchmark I-O accounts.

how they can be used to get a clearer picture of the scope of IP-licensing in the domestic economy are described in the next section of this paper.

**Economic Census Data and Payments for the use of IP**

In the 2002 Economic Census, payments for IP-licensing service commodities are reported for several industries as royalty receipts. These royalties reflect payments for the use of copyrighted material as well as patents, trademarks, franchising, and the use of natural resources and are classified by industry on an establishment basis.

For 2002 these royalty receipts are shown in Table 6. The $24 billion in Census-measured royalty receipts are received by establishments in four areas of the economy: Information (51), Real Estate and Rental Leasing (53), Management of Companies and Enterprises (551), and Arts, Entertainment, and Recreation (71). Census product lines for these industries identify the IP-licensing service commodities at varying levels of aggregation. For the establishment-based industry with the most royalty receipts, NAICS industry 533, product lines are identified based on type of intangible.

**Royalty Receipts from Corporate Tax Returns**

Although Census provides royalty receipts for these information and service industries, BEA's Benchmark I-O accounts use the Internal Revenue Service's Statistics of Income (SOI) data from corporate income tax returns in place of Economic Census data because the IRS data provide a more comprehensive measure of receipts for the use of IP-licensing service commodities. Compared with the limited set of industries for which royalty receipts are collected, IRS data reflects all industries.

Royalty receipts are estimated from a sample of the 2002 corporate income tax returns by the Statistics of Income staff based on the gross royalties income line of the

U.S. Corporation Income Tax Return Form 1120.[12] According to the SOI data, for 2002 the returns of active corporations reported gross royalty receipts of $115.8 billion dollars. Table 7 presents royalty income by industry sector and then sorted by magnitude of industry royalty receipts. All manufacturing industries together receive $72.7 billion dollars in royalty income and three manufacturing industries, computer and electronic product manufacturing, chemical manufacturing, and transportation equipment manufacturing, make up 46% of the $115.8 billion total, or $53.3 billion dollars. Information industries receive $13.4 billion dollars in royalties. The wholesale and retail trade industries within the Distributive Services sector receive $11.8 billion dollars in royalties.

The right-hand column of the table below presents the share of total receipts that are comprised of royalties. This gives an indication of the role of licensing of intangibles and intellectual property as a source of direct income. For all industries the average is 0.6%, with most of the higher shares coming from industries in the manufacturing and information sectors. Two more industries have above average shares of receipts from royalties: Food Services and Drinking Places (1.3%), and Accommodation (1.2%). Census and industry specific information can be used to identify royalties in these two industries as predominantly franchise licensing fees. However, the industry in the IRS data that receives the largest share of receipts from royalties is Lessors of Non-financial Assets. In 2002, according to the SOI data, this industry received 34% of its IRS reported income from royalties.

[12] Additional royalty income is collected domestically by partnerships, S-corporations and individuals. According to the IRS's Statistics of Income, in 2002 partnerships reported an estimate $8.0 billion dollars in royalty income, while S-corporations reported $598 million dollars in royalty income. Individual income tax returns reported an estimated $29 billion dollars in net rental and royalty income in 2002. These data are available at http://www.irs.gov/taxstats/.

Since the I-O accounts estimate each type of commodity output from all the industries that produce it, in absence of complete data from Economic Census for royalty receipts, BEA has in past years used this IRS royalty income to estimate what has been defined in this paper as IP-licensing service commodities. This I-O estimate is for the establishment-based output of Lessors of Non-financial Assets (excluding copyrights) and its predecessor in terms of the industry classification system, the Standard Industrial Classification (SIC) industry, Patent Holders and Lessors. The classification shift from NAICS to SIC increased BEA's estimation challenge—the SIC industry included copyrights, and the new NAICS industry excluded them.

Aside from the aggregation of copyright royalties with other types of royalties and licensing fees, the use of administrative records data like the SOI data for statistical purposes carries other challenges. First, since the data are drawn from corporate income reports of taxable income, there is an incentive for domestic income in general to be underreported. On the other hand, there is a potential for double-counting in cases where a corporation both receives and pays royalties, for example in a sub-licensing arrangement with franchisees. Third, royalty income includes payment for the exploitation of natural resources, such as coal, gas, oil, copper, or timber (Code of Federal Regulations, Title 26, Section 1.61.8). The inclusion of royalties for exploitation of natural resources prevents a clean separation of royalties for the use of IP. Finally, corporate income as reported on the 1120 forms includes income earned by foreign branches of U.S. firms. Thus some component of corporate royalty income does not represent domestic transactions. Despite these many caveats, SOI data on royalty income

by industry are the most comprehensive publicly available indicator of the magnitude and industry distribution of domestic corporate royalty income.

**Comparing IRS data to Economic Census data**

One of the issues affecting the comparison between the IRS royalty data and the Census data is the basis for industry classification. IRS data are collected at the firm level, and Census data are collected at the establishment level. Because IP-licensing commodities are produced in many industries, each industry that has establishments collecting receipts for IP-licensing must be identified in order to develop a comprehensive I-O measure of output. The IRS data, by contrast, simply aggregates royalty income for the firm across all establishments.

For Census-covered industries in Information (51), Real Estate and Rental Leasing (53), Management of Companies and Enterprises (551), and Arts, Entertainment, and Recreation (71), Table 6 (Census Receipts) provides establishment-based detail to make estimates for IP-licensing that can be compared to the IRS firm-based receipts.

For the publishing industry (Line 1) the establishments in this industry receive a small share, $0.4 billion, of the enterprise-based IRS measure of royalties, $4.8 billion (table 7). The remainder of the publishing industry royalties is collected either in NAICS 533, NAICS 551, is not collected by Census, or is not separately identified by Census.

For the next Census reported industry, Motion Picture and Sound Recording, the Census data line up closely with the enterprise-based total ($2.4 billion), suggesting that most of the royalty receipts in this industry are collected in establishments with the same classification.

For Lessors of Non-financial assets, the difference in the reporting basis is one of the reasons for the large difference in royalty receipts between the two data sources. IRS-based receipts total just $384 million dollars compared to the Census receipts of $16 billion. The IRS-based receipts represent all the corporations that identify their primary source of receipts as leasing of non-financial intangible assets. These include the technology transfer firms discussed earlier. For the Economic Census, the $16 billion represents establishments that may be attached to any industry but perform the economic activity of leasing the firm's intangibles and managing its intellectual property portfolio. This suggests that most of the Census receipts in NAICS 533 are collected in establishments that are part of other industries and exist to license the industry's intangibles.

Overall, the gap between total royalty receipts in the IRS data and the sum of licensing receipts in the Census data is large. Census recognizes $24 billion in licensing and royalty receipts, while IRS recognizes $115.8 billion in royalties. The next three sections of this paper use alternate data sources and the Mohr-Murphy IP-licensing commodity definitions to identify the source of this gap and make estimates for the industries that are not covered by Census data.

**Estimating Franchise Licensing Fees**

Franchise licensing fees represent substantial royalty income for several industries, most prominently the Food Service and Drinking Places industry and the Accommodation industry (table 7). Royalties for the use of business franchises are estimated for this paper with data on total receipts, the share of total industry receipts represented by franchisee-operated establishments, and average annual royalty payments

then compared with IRS royalty income. Since this type of information is not generally available from statistical agencies, data from the franchise industry are used here to develop estimates of payments for the use of franchised business formats.[13]

For Food Service and Drinking Places, the franchisee share of the industry is available in the 2002 Economic Census. Using the franchisee share of industry receipts for full and limited service restaurants and industry association royalty rates yields an estimate of $3.2 billion for 2002.[14] This estimate is relatively close to the IRS reported royalties for this industry-- $3.6 billion and suggests that IRS royalties can be attributed almost entirely to franchise royalties. For the Accommodation industry, using franchise industry estimates of the share of industry represented by franchisee-owned businesses and the average royalty rate, the Accommodation industry (NAICS 721) received franchise royalties of about $1.2 billion in 2002.[15] This compares to an IRS royalty receipts total of $1.6 billion for NAICS 721, Accommodation.[16]

For the rest of the industries in Table 7, statistical data are absent to make estimates of either the supply or the use of IP-related commodities. As noted earlier,

[13] A summary of royalty fees developed from the Uniform Franchise Offering Circulars that twelve states require for business format franchise offerings is combined with information on the share of industry payroll in establishments that pay franchise royalties. Because the published level of industry aggregation of the data is not particularly detailed, this information is most useful for Food Service and Drinking Places and Accommodation, the two industries with very large royalty receipts.

[14] 2002 Economic Census, Sector 72, Accommodation and Food Service, Miscellaneous Subject Series Table 7. Frandata Corporation (2000) provides annual royalty rate estimates of 4.2% for full service restaurants and 4.7% for limited service restaurants as part of its royalty analysis in the Profile of Franchising. For more information on franchise royalty structure, see pages 122- 151. Because the initial study was created for 1998, Frandata provided the author with updated royalty rates for 2004, and the rates were averaged to create a usable royalty rate for 2002.

[15] Economic Impact of Franchised Businesses, PriceWaterhouseCoopers (2004), these data were created for 2001. A reality check for Full and Limited Service Restaurants suggests that the EIFB numbers are in the right range, EIFB suggests that 10.8% of payroll for full service restaurants was in franchisee-operated establishments. The Census ratio based on receipts is 12.4%. For Limited Service restaurants the EIFB ratio is 44.3% and the Census ratio is 43.9%. These EIFB estimates are based on three sources: U.S. Census's County Business Patterns, Nonemployer Statistics, and the IMPLAN model.

[16] It is likely that Census will substantially expand its collection of franchise-related receipts for the 2007 Economic Census, leading to a substantial future improvement in this component of IP-related service transactions.

using the IRS data directly would include royalties for copyrights. Since the IRS royalties data indicate that about $73 billion in royalties are received by manufacturing firms, another approach must be used to separate IP-related commodities by type and assign them to industries. To do this, I create a proxy distribution for the IP-licensing commodities by industries based on BEA International data on receipts of royalties and licensing fees between unaffiliated parties.

**Comparing BEA International Royalties Data with the IRS Royalties**

Assuming that domestic demand for IP-licensing commodities is similar to international demand for U.S. IP-licensing commodities, the BEA data described earlier by type of intangible can be used to create a proxy distribution for royalties.[17] Factors that influence international transactions but not domestic transactions would weaken this assumption.

Two potential problems that may distort the distribution across types of IP service commodities are differing international policies for corporate taxation and for intellectual property protection. As discussed earlier, there is evidence that national differences in tax policies influence the location of intellectual property and where income is reported for multinational corporations. Since the arms-length nature of unaffiliated royalty transactions renders them less susceptible to this impact, unaffiliated transactions are a better proxy for domestic transactions than are affiliated transactions.

While unaffiliated transactions are less susceptible to these tax-related distortions, unrelated firms have more at risk from a foreign licensee in terms of misappropriation of

[17] In a related exercise, Degnan (1998) used the IRS industry distribution of royalties to parse out the likely industry distribution of unaffiliated receipts. This paper estimates types of IP-licensing commodity by industry.

intellectual property than entities within the same multinational corporation. Therefore, unaffiliated transactions are more likely than affiliated transactions to be affected by national differences in intellectual property protection. If the institutional environment with respect to intellectual property is substantively different from that of the U.S, this could make the distribution of international royalties unsuitable for distributing domestic royalties. While the economic literature has produced mixed results on the relationship between international licensing and the strength of international property rights regimes (see Park and Lippoldt (2004) for a review), if the bulk of the international licensing transactions were between countries with very different intellectual property rights regimes, this would at least be an additional cautionary factor.

Based on an index of patent rights from Park and Wagh for 2000, countries providing the largest volume of unaffiliated receipts are predominantly those with the highest rankings for patenting rights (table 8). The patent index is a five point scale on a set of minimum international standards for patenting rights (the U.S. receives a five on this scale). Countries with an index ranking of 3.9 or above provided 80 to 90 percent of the receipts for the use of industrial processes (patents, trade secrets and formulas).[18] Table 9 presents the distribution of receipts for the use of IP protected as industrial property and the distribution of receipts across different types of IP sorted by country based on the magnitude of receipts in 2002. This ranking is presented together with Park and Wagh's 2000 index of patent rights for the countries that U.S. firms receipts for royalties and licensing came from in the unaffiliated transactions. As rows one and two

[18] Park and Wagh's index does not provide an index value for Taiwan, a country whose firms provide a large component of U.S. unaffiliated receipts. Information from a pharmaceutical IP index created by Pugatch (2006) suggests that Taiwan's IP index is nearly consistent with those of South Korea (4.2) and Singapore (4.05). Using these values for Taiwan would raise the share of receipts coming from countries with similar intellectual property rights regimes from 81.5 percent to 89.8 percent.

of the table show, countries with a patenting index of 3.9 or above provide proportionately higher receipts for both industrial property and trademarks compared with the total distribution in 2002.

For this type of distribution of intangibles, at least two issues affect the comparison between IRS royalties and BEA unaffiliated royalties and license fees. These are the match between intangibles and inclusion of payment for the purchase of intangibles together with payments for use. IRS reported royalties are assumed to be a combination of 1) licensing of rights to use IP protected as industrial property, 2) licensing of rights to use IP protected by trademarks, 3) licensing of rights to use IP protected by copyright, 4) licensing of rights to use a business format under a franchise and 5) royalties for the use of natural resources.

Compared with the IRS royalties, the BEA data on international royalty transactions for unaffiliated entities cover a somewhat different spectrum of intangibles and so must be adjusted before being used to infer the distribution of IP-licensing commodities. Six of the seven types of intangibles covered in the BEA data match the available definition of scope of the IRS royalties. Although royalties for the use of patented software would be in scope for IRS royalties, it is more difficult to make this determination for the licensing fees for general use computer software.[19] The assumption used in this paper is that IRS royalties are passive income rather than payments for a

[19]IRS staff contacted noted that it was not possible for them to answer whether these royalties included licensing fees for general use software.

service or a good, and this assumption excludes electronically transmitted software as well as end user license fees for shrink-wrapped software.[20]

The BEA international transactions data for royalties and licensing fees category includes a category for both the rights to reproduce software and for the general use of electronically transmitted software. While the rights to reproduce software are clearly within the scope of the IP-related service commodities, the latter use is more closely aligned to the licensing of software for end use as a final expenditure and more likely to be the majority of the payments and receipts. As discussed earlier, this final use software would be outside of the scope of licensing of the rights to use IP in the service commodities above. For these reasons general use computer software licensing receipts and payments are not included in the estimation of IP-licensing commodities. Excluding computer software licensing, receipts for royalties and licensing fees for the use of industrial processes makes up 55.1 percent of the unaffiliated royalty receipts for 2002 (table 9, first row).

A final caveat is that BEA data combines some payments and receipts for the use of intangibles with payments and receipts for the purchase of intangible assets and thus presents undifferentiated income for production (the IP-licensing commodity) with income for the sale of assets.

**Approximating the Supply of IP-licensing Commodities by Industry**

Table 9 presents the author's distribution of the supply of four IP-related service commodities by industrial sector based on the totals from IRS corporate royalty receipts.

[20] Testing this assumption would involve information about what types of software-related income firms are actually reporting on the royalty income line of their corporate income tax return. This is one of the subjects of future work for these estimates.

The underlying distributions were created at the level of the IRS industries in Table 7. Three IP-licensing commodities, licensing of the rights to use IP protected as industrial property and trademarks, franchise fees, and licensing of rights to use natural resources are the commodity output of NAICS 533, Lessors of Non-financial Intangible Assets. As noted earlier, licensing the rights to use copyrighted material is a service commodity produced by other industries.

The industry totals are directly from the IRS data while the distributions across types of intangible are created by the author based on the available Census data, the distribution of BEA receipts from unpublished data aggregated to match the IRS industries, and estimates based on franchise industry data.[21] They provide an indication of the distribution of IP-licensing receipts.

Table 9 shows substantial IP-related receipts outside of the industries identified by Census as receiving royalty receipts. My estimate suggests that the manufacturing sector receive the vast majority of all licensing receipts for the right to use IP protected as industrial property. The largest recipients are the chemical manufacturing industry and the computer and electronic product manufacturing industry. Industries in manufacturing also receive substantial receipts for both the use of trademarks and franchises. Both of these are in large part due to beverage manufacturing. For the Distributive Services sector, the largest share of IP-licensing service commodity receipts are from the use of

[21] These estimates are based on Census data where it was available, supplemented with franchise royalty estimates. For the remainder of the industries, IRS-based royalties were spread across the types of IP using the ratios from BEA international receipts for the purchase and use of intangibles based on the assumption that domestic demand for the licensing of U.S. intellectual property has a similar structure to international demand for U.S. intellectual property. For industries without international transactions, mostly in the service industries, royalties were evenly split between trademarks and franchise royalties. Payments for right to use natural resources are combined with "Other Intangibles," a category that includes spectrum rights for broadcasting. This category represents payments for the use of non-IP intangibles. All IRS royalties in agriculture and utilities were attributed to natural resources as well as a large share of mining royalties.

trademarks and franchises. While retail trade receipts are divided between trademarks and franchise receipts, wholesale trade receipts are predominantly trademark related and are linked to apparel wholesalers and grocery wholesalers. Within professional and business services, the scientific research and development services industry receives a large share of the licensing receipts for the use of IP protected as industrial property. Within the "other industries" category, franchise-licensing receipts are particularly large for accommodation and food service industries.

How can we evaluate the reasonableness of these estimates? Arora, Fosfuri, and Gambardella (2002) estimate the average value of the global market for technology licensing and related transactions at $36 billion dollars a year in 1990s, a value they suggest is likely an underestimate. They note that available estimates for the late 1990s, including Degnan (1998) are in the range of $35 to $50 billion dollars. The method used for 2002 produces estimates for U.S. corporate supply of IP-licensing of industrial processes as $27.4 billion dollars for 1995, $29.4 billion dollars for 1996, and $31.8 billion dollars for 1997.

While these estimates are in the range of others, the corporate royalties could be adjusted downward by ten percent to account for some the potential sources of double-count, leaving a range of $60 to $67 billion dollars for IP-licensing of industrial processes, $21 to $23 billion for IP-licensing of trademarks, $8.5 to $9.5 billion for licensing of copyrights, and $14 to $16 billion for franchise licensing.

In terms of the distributions, the results from one of the questions on a 2003 survey of intellectual property managers by Cockburn and Henderson (CH 2004), can also be used for comparison purposes and suggest that the distribution of the proxy

estimates are also in the right range. IP managers were asked to estimate the fractions of total monetary value represented by their different IP assets, and the distribution was as follows: patents, 44.5%; trade secrets, 15.7%; copyrights, 8.8%; trademarks, 18.2%; know-how, 13.9%.[22] The approximations in Table 9 of IP-licensing receipts (excluding payments for natural resources and other intangibles) are distributed similarly. The share represented by industrial process licensing (patents and trade secrets) represents 58.1% of the total, compared to 60.2% in the CH survey for patents and trade secrets; copyrights represent 8.2% of the total, compared to 8.8% in the CH survey. The comparison for trademarks is 19.9% compared to 18.2% in the CH survey. Since franchise licensing is the use of both a trademark and a business format, it might be preferable to combine franchise licensing share with the trademark share. The share for both franchising and trademarks is 33.6%. On the whole this evidence suggests that the IP-licensing commodity distributions are in the right range.

Since this analysis is based on corporate income tax receipts, a total view of the supply of IP-licensing commodities will include additional sources of supply. In the for-profit sector these are partnerships, S-corporations, and individuals. Royalty income for partnerships and S-corporations was $8.6 billion in 2002 while total rental and royalty income for individual income tax returns was $29 billion. Additionally, academic institutions receive licensing fees and royalties. The 2002 survey of the Association of University Technology Managers indicated that royalties received by surveyed universities totaled $787 million dollars (AUTM (2003)).

[22] They had 81 usable surveys from managers of intellectual property and reported that 44% of these identified their corporations as IT and communications, 22% from the chemical industry, 14% from life sciences, 16% from mechanical sectors, and less than 7% from financial and service sectors. These total these shares slightly exceeds 100% as do the shares of IP assets, likely due to rounding and some respondents not claiming all types of IP assets.

**Where are the royalty receipts for manufacturing in statistical data?**

The evidence above suggests that manufacturing industries supply a large share of the IP-licensing commodities reflected by royalty payments in the IRS data. The receipts for these transactions do not appear directly in existing domestic economic survey data. If they are collected by Census, there are two potential locations in the Economic Census for the missing receipts for manufacturing; these are miscellaneous receipts and non-employer establishments. The unidentified or miscellaneous receipts received by U.S. manufacturing establishments are a small fraction of the IRS-reported royalties for the manufacturing sector, and thus, even if manufacturing establishments were asked to break out their receipts for IP-related service commodities from miscellaneous receipts, this would not locate all the missing receipts. The likely establishment-based recipient of these royalty receipts is either the corporate headquarters (NAICS 551) or an establishment set up for the purpose of leasing IP and intangible assets (NAICS 533).

For 2002, the sum of patent leasing and licensing for Lessors of Non-financial Assets (533) and all of the payments for intangibles other than franchise fees for Management of Enterprises (551) is $11,549 million dollars (Table 6). This is a fraction of the receipts for Industrial IP as identified from the IRS data. Although this suggests that non-employer establishments may be collecting the licensing receipts, estimates of non-employer receipts are not large enough to contain all the missing royalties. Census reports broad aggregates for non-employer receipts. For Sector 53 as a whole, real estate and rental and leasing, total non-employer receipts are $161.8 billion. However, BEA also receives unpublished estimates for the industries within Sector 53, and the amount of

these receipts coming into the non-employer component of NAICS 533 is not large enough to account for the unidentified IP-licensing commodities. Locating these transactions would involve an enterprise-based survey that specifically tracked IP-licensing commodities payments.[23]

**Future Work**

**Cross-Licensing and Imputed Transactions**

In addition to own use and direct licensing, a large share of the value of intangibles comes from cross-licensing of patent portfolios. Cross-licensing agreements between firms allow the parties to the agreement to use each other's patents or other intellectual property. Where the estimated value of the patent portfolios differ, a net royalty is paid by the owner of the lesser valued portfolio. If the value of each party's relevant intellectual property is considered to be equivalent, then the cross-licensing agreement involves no direct exchange of payment. Grindley and Teece (1997) describe these agreements as particularly important in industries like electronics, semiconductors, aircraft, and automobiles, where product development is dependent on a cumulative process of related and interconnected technologies. In these industries firms typically establish a field of use and cross-license their entire related set of patents to each other. Low cost access to the technology of other firms then becomes an important additional

[23] One effort in this direction is an intangible assets survey has been recently developed by Industrial Statistics and Studies Division (SESSI) of the Ministry for the Economy, Finances, and Industry of France. The survey, initiated in 2003, is directed at the firm level, and includes questions about marketing and advertising, innovation and research policy, research and development, and management of intellectual property rights. The survey asks about both management costs and income from intellectual property rights. Specifically, the survey asks for 1) the net amount of fees and royalties received by the group from third parties for the use of intellectual property rights, 2) the net amount of fees and royalties paid by the group to third parties for the use of IP rights, 3) other costs connected with IP rights, including the costs of registering and maintaining patents, and 4) the number of employees involved in maintaining IP rights.

reason for innovation and patenting. Cross-licensing agreements are imputed transactions that should, theoretically, be reported in both the BEA's international service transactions data and as IRS income, since the latter includes barter income within the scope of taxable receipts. To the extent that these cross-licensing transactions are under-reported, the estimates of technology-licensing in this paper under-estimate the full extent of the market.

**Identifying Royalties for Foreign Branches and Software in the IRS data**

Uncertainty about the amount of IRS reported royalty income that is actually received by foreign branches affects the total that is used here to estimate the IP-licensing commodities. The distribution of the licensing commodities used here is based on the assumption that royalties for patents and copyrights are the only software-related income in the IRS royalties. Joint work with IRS research staff is needed to resolve these two issues.

**Estimating the Use of IP-related service commodities.**

A next step in this process is to develop estimates of the use of IP-related service commodities in the domestic economy. Information about inputs for the I-O accounts comes from a variety of sources, but the Annual Survey of Manufactures, the Economic Census surveys on Materials Consumed for Mining, the Business Expense Surveys for Wholesale Trade, Retail Trade, and selected services provide the foundation for these input estimates. None of the Census surveys separately request royalty expenses; instead they are included with aggregate categories such as other operating expenses.

Licensing payments for the use of a franchised business format can be directly tied to establishment-based industries. Franchise fees for full service and limited service

restaurants can be assumed to be paid by these establishments. While data are sparse for the 2002 I-O accounts, the likely additional franchise-related questions in future Economic Censuses for a broad group of industries will enable the use of this IP-related service commodity to be partially identified.

The other three IP-related commodities -- licensing of industrial processes, copyrighted works, and trademarks -- are much harder to tie to an establishment, especially without additional information from Census breaking payments for the use of these intangibles out of the rest of business expenses. Intangibles can be paid for once and used multiple times, and need not be used where they are paid for. Thus payments for the use of an industrial process could be made from a company headquarters, yet the industrial process could be used in a manufacturing establishment.[24]

**Summary**

Using a variety of sources, broad estimates of IP-licensing and related transactions have been presented for 2002 using a readily available product taxonomy created by Census. The analysis suggests that manufacturing firms are likely to be important suppliers of IP-licensing commodities and that our statistical survey data in the U.S. are not fully capturing the domestic component of these transactions. To the extent that these transactions are accounted for in Census-based measures, the majority of them are likely to be in either miscellaneous receipts or non-employer receipts that cannot be directly identified.

[24] Proprietary data on technology transactions have also been used to estimate the market for technology transfer and the inter-industry patterns of supply and demand. Arora, Fosfuri, and Gambardella (2002) used a proprietary database of technology transactions from the Securities Data Corporation to estimate both the inter-industry patterns of supply and use of technology and the approximate size of the international market. The data they used included R&D expenditures reported in Security and Exchange Commission filings in the United States, and industry announcements about the value of transactions. This included information about licensing and royalty payments as well as R&D funding in exchange for licensing rights, and equity purchase of firms.

Measurement of royalties and licensing fees for the domestic economy is an important component of improved measurement of intangibles and intellectual property. Improving statistical collection of these direct, market based measures provide a means of estimating the stock of intangibles as well as tracing their flow between industries.[25] More accurate accounting will likely require enterprise-based surveys that focus directly on the creation of IP assets and transactions for their use, including cross-licensing. This kind of information would resolve a great deal of the ambiguity surrounding the estimates of unmeasured components of economic activity and provide a means to trace technology flows across industries. For economists and policy makers interested in understanding the impact of intangibles on the economy, improved measurement is the essential next step.

[25] The widely used equation for the value of a capital asset when new, $V_0$ shows that measurement of the service flow or payment for the use of the asset, *f,* together with the rate of depreciation, $\delta$, which includes obsolescence, and the discount rate, $r$, could provide an independent measure of the value of the asset :

$$V_0 = \sum_{t=1}^{\infty} \frac{(1-\delta)^{t-1} f}{(1+r)^t}$$

This formulation is appropriate for an asset with an infinite life. For patents and copyrights, the limited term of legal protection would modify the expression to the sum of the protection period.

## Table 1. Royalties and License Fees, Between the U.S. and Top Five Countries, 2002

**[millions of dollars]**

| Receipts | | | | Payments | | | |
|---|---|---|---|---|---|---|---|
| Affiliated | | Unaffiliated | | Affiliated | | Unaffiliated | |
| Total | **32,770** | Total | **11,738** | Total | **15,134** | Total | **4,219** |
| Top Five | | Top Five | | Top Five | | Top Five | |
| United Kingdom | 3,402 | Japan | 3,236 | Japan | 4,566 | France | 688 |
| Japan | 3,102 | Germany | 1,073 | Germany | 1,710 | United Kingdom | 512 |
| Canada | 2,407 | Korea, Republic of | 939 | Switzerland | 1,701 | Switzerland | 472 |
| Singapore | 2,337 | United Kingdom | 906 | Netherlands | 1,443 | Japan | 440 |
| Germany | 2,052 | Canada | 707 | Bermuda | 1,357 | Other European Countries* | 409 |

*European Countries other than Belgium-Luxembourg, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom

Source:BEA: U.S. International Services: Cross-Border Trade 1986-2005, Royalties and License Fees, Table 4.
http://www.bea.gov/bea/di/1006serv/tab4.xls

## Table 2: Royalties and License Fees, 2002

**[ millions of dollars]**

| | Total | Industrial processes[1] | Books, records, and tapes[2] | Broadcasting and recording of live events[3] | Business format Franchise fees[4] | Trademarks[5] | General use computer software[6] | Other intangibles[7] |
|---|---|---|---|---|---|---|---|---|
| **Receipts** | | | | | | | | |
| Between Unaffiliated Parties | 11,738 | 4,039 | 516 | 296 | 542 | 1,284 | 4,408 | 651 |
| By U.S. parents from their foreign affiliates | 29,656 | | | | | | | |
| By U.S. affiliates from their foreign parents | 3,114 | | | | | | | |
| Receipts Total | 44,508 | | | | | | | |
| **Payments** | | | | | | | | |
| Unaffiliated Payments | 4,219 | 2,049 | 301 | 906 | 3 | 283 | 487 | 190 |
| By U.S. parents to their foreign affiliates | 2,925 | | | | | | | |
| By U.S. affiliates to their foreign parents | 12,209 | | | | | | | |
| Payments Total | 19,353 | | | | | | | |

* Data are from BEA's International Investment Division and are available on the BEA website as U.S. International Services: Cross Border Trade, 1986-2005; Table 4, Royalties and License Fees 1986-2005. These data are collected on BE-577 for transactions between U.S. parents and their foreign affiliates and the BE-605 for transactions between U.S. affiliates and their foreign parents.

1. This includes the use, sale or purchase of intangibles that are used in connection to the production of goods as well as technology licensing fees, royalties, and payments for the use of patents, trade secrets, and other proprietary rights used in the production of goods. The category includes payments to foreign governments for the maintenance of patent rights.
2. This includes the rights to perform, broadcast, reproduce and sell copyrighted material and other intellectual property in the form of books, compact discs, audiotapes.
3. This includes the rights to record and or broadcast "live" artistic performances, sports events, and other live events.
4. Business format franchising is an ongoing business relationship between a franchisor and franchisee that includes not only the product, service, or trademark, but also the business format.
5. This includes the rights to sell products under a trademark, brand name, or signature, including domain name registration for the internet.
6. This includes rights to distribute general use software and rights to reproduce or use general use computer software electronically produced from a master copy. It includes licensing fees for reproducing copies of general use software for local area network computer systems and excludes prepackaged software as well as custom software and programming services.
7. Intangibles not elsewhere classified, including rights to secure capacity for communications carriers

## Table 3. Receipts of Royalties and License Fees From Unaffiliated Foreigners, by Industry Sector and Type of Intangible, 2002

**[millions of dollars]**

| | Total | Industrial processes | Other /1/ |
|---|---|---|---|
| All industries | 11,738 | 4,039 | 7,699 |
| Manufacturing | 3,585 | 2,809 | 777 |
| Distributive services /2/ | 271 | 29 | 242 |
| Information | (D) | (D) | 4,368 |
| Finance and insurance | (D) | - | (D) |
| Professional, scientific, and technical industries | 1,159 | 342 | 818 |
| Other industries /3/ | (D) | (D) | (D) |

See notes below

## Table 4. Payments of Royalties and License Fees to Unaffiliated Foreigners, by Industry Sector and Type of Intangible, 2002

**[millions of dollars]**

| | Total | Industrial processes | Other /1/ |
|---|---|---|---|
| All industries | 4,219 | 2,049 | 2,170 |
| Manufacturing | 2,933 | 1,776 | 1,157 |
| Distributive services /2/ | 66 | (D) | (D) |
| Information | 596 | 2 | 594 |
| Finance and insurance | (D) | - | (D) |
| Professional, scientific, and technical industries | (D) | (D) | 85 |
| Other industries /3/ | 332 | 59 | 273 |

(D) Suppressed to avoid disclosure of data of individual companies.

1. Other consists of payments for rights related to books, records, and tapes; broadcasting and recording of live events; franchise fees; trademarks; general use computer software; and other intangibles.

2. Distributive Services include Wholesale and Retail Trade and Transportation.

3. Other industries include unallocated payments.

## Table 5. Summary of Data Sources for Royalty-related Receipts and Income

| Data Source | Receipts or Income in billions for 2002 | Coverage | Scope of Royalty and Licensing Rights | Adjustments to match scope of Lessors of Non-financial Intangible assets, excluding copyrights |
|---|---|---|---|---|
| BEA International Services Transactions, Receipts for Royalties and Licensing Fees | 44.5 | International transactions for affiliated and unaffiliated entities as well as payments | industrial processes, including patents and trade secrets;<br>books, records, tapes;<br>broadcasting and recording of live events;<br>franchises;<br>trademarks;<br>general use computer software; and other intangibles<br>includes purchase as well as use of these intangibles | 1) remove receipts related to copyrights--books, records, tapes, and broadcasting and recording of live events<br>2) remove receipts related to general use computer software |
| Economic Census Royalty Receipts | 24.0 | U.S. establishments with paid employees, Census data only available for selected industries | content published on the internet;<br>musical compositions;<br>master recordings;<br>television program rights;<br>oil and petroleum;<br>patent leasing and licensing;<br>franchise leasing and licensing;<br>software, music, motion picture, and other intellectual property;<br>literary works, musical recordings, filmed entertainment, and other cultural works | remove receipts related to copyrights--published works, music, films, entertainment, and cultural works |
| IRS Royalty Income | 115.9 | Gross royalty income for U.S. corporations | books, stories and plays;<br>copyrights;<br>trademarks, formulas, and patents;<br>exploitation of natural resources | remove receipts related to copyrights--including books, stories, and plays |

**Table 6. Economic Census Data on Royalty Receipts, 2002, [millions of dollars]**

| Industry | | | | Total Royalties |
|---|---|---|---|---|
| | | | | 24,039 |
| | | | | |
| 1) Publishing Industries Except Internet (511) | | | | 460 |
| | Sale or licensing of rights to content | | 460 | |
| | | | | |
| 2) Motion Picture and Sound Recording Industries (512) | | | | 2,408 |
| | Royalties, license fees and other payments for authorizing the use of musical compositions | | 1,665 | |
| | Receipts for sales, leasing, and licensing fees for master recordings | | 743 | |
| | | | | |
| 3) Telecommunications (517) | | | | 5,207 |
| | Television program rights | | 5,207 | |
| | | | | |
| 4) Internet Service Providers, Web Search Portals, Data Processing Services (518) | | | | 71 |
| | Sale or licensing of rights to content | | 71 | |
| | | | | |
| 5) Other Information Services (519) | | | | 80 |
| | Sale or licensing of rights to content | | 80 | |
| | | | | |
| 6) Lessors of Non-financial Intangible Assets (533) | | | | 15,959 |
| | Oil and Petroleum | | 366 | |
| | Patent Leasing/Licensing | | 7,761 | |
| | Franchise Leasing/Licensing | | 5,960 | |
| | Copyright Leasing/Licensing | | 1,490 | |
| | All Other | | 382 | |
| | | | | |
| 7) Management of Companies and Enterprises (551) | | | | 5,055 |
| | Sales, license fees, royalties and other payments from the marketing of intangible property such as software, music, motion pictures, and other intellectual property | | 3,788 | |
| | Franchise Sales and Fees | | 1,267 | |
| | | | | |
| 8) Performing Arts, Spectator Sports, and other related works (711) | | | | 2,686 |
| | Amounts received from royalties, licensing fees, and residual fees from literary works, musical recordings and compositions, filmed entertainment and other cultural works | | 2,686 | |
| | | | | |
| 9) Museums, Historical Sites, and Similar Institutions (712) | | | | 46 |
| | Amounts received from royalties, licensing fees, and residual fees from literary works, musical recordings and compositions, filmed entertainment and other cultural works | | 46 | |

Note: These royalty receipts are found in the 2002 Economic Census publications titled "Subject Series," and are drawn in each case from Table 1, Product Lines

## Table 7. IRS Royalties by Industry and Percent of Total Receipts from Royalties, 2002 --Continues,

**[ millions of dollars]**

| Sector | |
|---|---|
| Manufacturing | 72,767 |
| Distributive Services (Wholesale, Retail, and Transportation) | 13,112 |
| Information | 13,463 |
| Finance and Insurance | 2,362 |
| Professional and Business Services | 6,654 |
| Total Royalty Income from All Industries | 115,860 |
| Average Percent of Total Receipts from Royalties | 0.59% |

| Industry | Royalty Receipts | Percent of Receipts from Royalties |
|---|---|---|
| Computer and electronic product manufacturing | 23,317 | 4.3% |
| Chemical manufacturing | 20,482 | 3.1% |
| Transportation equipment manufacturing | 9,406 | 1.1% |
| Publishing industries | 4,755 | 2.2% |
| Professional, scientific, and technical services | 4,692 | 0.7% |
| Beverage and tobacco product manufacturing | 4,305 | 2.0% |
| Food services and drinking places | 3,564 | 1.3% |
| Wholesale Trade, Nondurable goods | 3,190 | 0.3% |
| Machinery manufacturing | 2,516 | 0.8% |
| Motion picture and sound recording industries | 2,422 | 2.8% |
| Broadcasting, radio and television, cable networks and program distribution | 2,308 | 3.2% |
| Electrical equipment, appliance, and component manufacturing | 2,246 | 0.9% |
| Building Materials and Garden Equipment and Supplies Dealers | 2,226 | 1.2% |
| Fabricated metal product manufacturing | 2,168 | 0.8% |
| Miscellaneous manufacturing | 1,996 | 1.1% |

Internal Revenue Service (2005), Statistics of Income - 2002, Corporation Income Tax Returns, Table 6--Balance Sheet, Income Statement, Tax, and Selected Other Items, by Major Industry

## Table 7. IRS Royalties by Industry and Percent of Total Receipts from Royalties, 2002 --Continued,

**[ millions of dollars]**

| Industry | Royalty Receipts | Percent of Receipts from Royalties |
|---|---|---|
| Internet Service Providers, web search portals, and data processing services | 1,952 | 2.4% |
| Telecommunications | 1,922 | 0.5% |
| Food manufacturing | 1,864 | 0.5% |
| Accommodation | 1,456 | 1.2% |
| Food, beverage, and liquor stores | 1,434 | 0.3% |
| Administrative and support services | 1,370 | 0.5% |
| Wholesale Trade, Durable goods | 1,365 | 0.1% |
| General merchandise stores | 1,350 | 0.3% |
| **Other Royalty Intensive Industries** | | |
| Industry | Royalty Receipts | Percent of Receipts from Royalties |
| Paper manufacturing | 923 | 0.6% |
| Mining | 923 | 0.6% |
| Other transportation and support activities | 805 | 0.6% |
| Apparel manufacturing | 641 | 0.9% |
| Sporting goods, hobby, book, and music stores | 482 | 0.6% |
| Printing and related support services | 481 | 0.5% |
| Lessors of nonfinancial intangible assets | 384 | 34.1% |
| Educational services | 215 | 0.8% |
| Other information services | 87 | 0.4% |
| Leather and allied product manufacturing | 68 | 0.7% |
| Internet Publishing and Broadcasting | 17 | 0.5% |
| | | |
| All Other Industries | 8,526 | |

Internal Revenue Service (2005), Statistics of Income - 2002, Corporation Income Tax Returns, Table 6--Balance Sheet, Income Statement, Tax, and Selected Other Items, by Major Industry

## Table 8. Patent Rights Index and the Distribution of Receipts for Royalties and Licensing Fees from Unaffiliated Entities, 2002

| | | | Distribution of Receipts* | | | | |
|---|---|---|---|---|---|---|---|
| Countries | Index of Patent Rights ** | Receipts in millions, Industrial processes | Use of Industrial processes | Books, records, and tapes, broadcasting and recording of live events | Franchise fees | Trademarks | Other intangibles |
| All Countries | | 4039 | 55.1% | 11.1% | 7.4% | 17.5% | 8.9% |
| Countries with Index of 3.9 or above | | 3293 | 62.6% | 11.8% | 6.2% | 19.0% | 0.5% |
| Japan | 4.19 | 1273 | 69.4% | 5.3% | 2.0% | 22.9% | 0.4% |
| Korea, Republic of | 4.2 | 613 | 87.9% | 2.2% | 4.2% | 5.0% | 0.7% |
| Germany | 4.52 | 389 | 71.1% | 14.8% | 5.7% | 8.4% | near 0% |
| Taiwan | NA | 336 | 89.8% | 2.9% | 3.2% | 4.0% | 0 |
| United Kingdom | 4.19 | 236 | 47.6% | 21.2% | 10.7% | 20.6% | 0 |
| Other Europe | NA | 199 | 51.8% | 14.6% | 10.9% | 20.3% | 2.3% |
| France | 4.05 | 193 | 61.3% | 18.1% | 4.1% | 16.5% | 0 |
| Canada | 3.9 | 138 | 34.5% | 19.0% | 15.0% | 31.5% | 0 |
| Switzerland | 4.05 | 123 | 83.7% | 7.5% | 1.4% | 7.5% | near 0% |
| Italy | 4.33 | 101 | 45.9% | 21.8% | 8.6% | 21.4% | 2.3% |
| Belgium-Luxembourg | 4.04 | 49 | 59.0% | 8.4% | 7.2% | 25.3% | 0 |
| Mexico | 2.86 | 40 | 30.3% | 21.2% | 13.6% | 34.8% | 0 |
| Sweden | 4.38 | 40 | 38.8% | 15.5% | 7.8% | 37.9% | 0 |
| Australia | 4.19 | 37 | 32.7% | 22.1% | 12.4% | 32.7% | 0 |
| China | 2.48 | 33 | 47.1% | 8.6% | 5.7% | 30.0% | 8.6% |
| Singapore | 4.05 | 28 | 63.6% | 4.5% | 15.9% | 11.4% | 4.5% |
| Netherlands | 4.38 | 26 | 40.6% | 32.8% | 6.3% | 20.3% | 0 |
| Other Western Hemisphere | NA | 19 | 35.8% | 13.2% | 35.8% | 15.1% | near 0% |
| Indonesia | 2.27 | 19 | 57.6% | 6.1% | 27.3% | 9.1% | near 0% |
| Hong Kong | 2.9 | 18 | 29.5% | 8.2% | 26.2% | 36.1% | 0 |
| Israel | 4.05 | 16 | 35.6% | 22.2% | 15.6% | 13.3% | 13.3% |
| Other Asia and Pacific, ex Taiwan | NA | 13 | 25.0% | 7.7% | 46.2% | 21.2% | 0 |
| South Africa | 4.05 | 13 | 43.3% | 23.3% | 13.3% | 20.0% | 0 |
| Thailand | 2.24 | 13 | 50.0% | 7.7% | 19.2% | 23.1% | near 0% |
| India | 2.18 | 13 | 61.9% | 4.8% | 4.8% | 28.6% | near 0% |
| Other Middle East | NA | 12 | 23.5% | 5.9% | 51.0% | 9.8% | 9.8% |
| Spain | 4.05 | 11 | 13.4% | 36.6% | 20.7% | 29.3% | 0 |
| Brazil | 3.05 | 10 | 23.3% | 46.5% | 4.7% | 25.6% | 0 |
| Other Latin America | NA | 6 | 9.1% | 22.7% | 28.8% | 39.4% | 0 |
| Saudi Arabia | NA | 5 | 13.2% | 5.3% | 26.3% | 7.9% | 47.4% |
| Venezuela | 2.9 | 5 | 15.2% | 42.4% | 12.1% | 30.3% | 0 |
| New Zealand | 4 | 4 | 20.0% | 45.0% | 20.0% | 15.0% | 0.0% |
| Norway | 3.9 | 3 | 14.3% | 19.0% | 42.9% | 23.8% | 0 |
| Other Africa | NA | 3 | 21.4% | 7.1% | 50.0% | 21.4% | 0 |
| Chile | 3.41 | 2 | 10.5% | 36.8% | 15.8% | 36.8% | 0 |
| Argentina | 3.33 | 1 | 10.0% | 40.0% | 10.0% | 40.0% | 0 |

* This distribution reflects the use of the data for allocating IRS receipts, and excludes the receipts for general use software because the IRS royalties are assumed to reflect passive income. Data are from BEA's International Investment Division, available on the BEA website as U.S. International Services: Cross Border Trade, 1986-2004; Table 4, Royalties and License Fees 1986-2004, collected on BE-577 for transactions between U.S. parents and their foreign affiliates and the BE-605 for transactions between U.S. affiliates and their foreign parents. ** Index of Patent Rights for 2000 from Park and Wagh, in Economic Freedom of the World: 2002 Annual Report.

**Table 9. Author's Distribution of IRS Receipts for Types of IP-Licensing Service Commodities across Industry Sectors, 2002,**

**[Billions of Dollars]**

| Sector | Licensing of Rights to Use IP Protected as Industrial Property | Licensing of Rights to Use IP Protected by Trademarks | Licensing of Rights to Use IP Protected by Copyright | Licensing of Rights to Use a business format under a franchise | Payments for rights to use Natural Resources and Other intangibles | IRS Royalties Total |
|---|---|---|---|---|---|---|
| Manufacturing | 59.5 | 9.4 | 1.0 | 2.9 | - | 72.8 |
| Distributive Services (Wholesale, Retail, and Transportation) | 1.0 | 6.9 | 0.1 | 5.1 | - | 13.1 |
| Information | 1.9 | 4.9 | 6.6 | 0.0 | 0.1 | 13.5 |
| Finance and Insurance | 0.2 | 0.7 | 0.0 | 1.4 | 0.0 | 2.4 |
| Professional and Business Services | 3.0 | 0.2 | 1.6 | 1.5 | 0.4 | 6.7 |
| Other Industries | 1.0 | 0.7 | 0.1 | 4.8 | 0.8 | 7.5 |
| Total | 66.6 | 22.8 | 9.4 | 15.7 | 1.3 | 115.9 |

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