

2009

Next Generation IP Metrics: Patent Value Indexes

David Silverman, Chief Operating Officer
David Kendall, PhD, Director of Research
Intellectual Property Exchange International





Next Generation IP Metrics: Patent Value Indexes (“PVI”s)

The initial goal in constructing PVIs is to provide valuable information about a wide variety of patent portfolios that IP owners and investors can use to improve their market intelligence about technology and innovation. The eventual goal is to use PVIs to create customized over-the-counter swap transactions for IP owners who wish to hedge exposure to specific risks, or for market participants who wish to invest or speculate in particular patent portfolios.

Presently, IPXI has created more than 100 PVIs, each of which can be found on the IPXI website (www.ipxi.com). There are five categories of PVIs, including:

- Public and private companies (e.g., Microsoft, Exxon-Mobil, Cargill, Koch);
- Technology (e.g., bio-fuel, solar, portable electronics);
- Industry (e.g., energy, healthcare, industrials);
- Country (e.g., US, EU, China); and
- Organization types (e.g., public companies, private companies, universities)

Constructing PVIs

The patent market is highly illiquid. In part, this is because each patent, by definition, covers a unique innovation, but also because there is no central marketplace where buyers and sellers convene to conduct transactions. However, just as real property can be bought, sold, and leased, there are a number of ways to monetize or accumulate patents: among these, private transactions, auctions, and licensing and enforcement programs are the most common methodologies utilized by market participants. All of these have high transactions costs and risks. There are a number of methods of valuing patents depending on the underlying technology, cash flows, and who is asking. The market price at any time depends on who the counterparty is and for what they plan on using the patent.

To the unique characteristics of patent markets we can add a traditional one, namely volatility. The value of a patent changes based on fluctuations in the value of the underlying technology. These fluctuations arise from either systematic changes, such as the perceived scope for patent enforcement or the premium the market assigned to a particular class of technologies, and non-systematic changes, such as the perceived value the specific technology might have in two years.

Patents are similar, in many ways, to options. Like options, patents are transferable, have an expiration date (in the U.S., 20 years from the filing date) and lack value if the underlying fails to appreciate by expiry. They contain exposure not just to the underlying revenue stream of the patent, but also to its volatility. The owner of the patent can also choose not to exercise the rights granted by the patent.



In fact, U.S. patents can be thought of as a highly complex series of three linked, four year and one variable length American call options (an American style option can be exercised at any time). The patent gives the owner the right to exclude others from commercializing his innovation. In practice, IP owners enforce this right against alleged infringers through threatened and actual suits in federal court. This right to exclude is valuable if the proceeds from litigating are expected to exceed the cost of litigating. Thus, patents possess a floating strike price which is the cost of another option – the enforcement action. After the patent is issued, the owner can pay the U.S. Patent and Trademark Office (“USPTO”) a fee to maintain the patent after 4, 8, and 12 years from issuance. If the owner does not pay the maintenance fee, the patent expires.

Patent Pricing and Risks: Basic Principles

In order to provide valuable information, PVIs must act as benchmarks that will allow IP owners to compare their own patent portfolios against those of competitors and in relevant technology spaces or geographical locations. This is similar to the way a mutual fund investor might benchmark a fund’s performance against the S&P 500 to ascertain whether the fund is well-managed.

However, while the S&P 500 is composed of publicly available equity prices and market capitalizations, no such prices are publicly available for patents. Therefore, any index of patent values must be based on some other determining set of information. In the case of PVIs, records of activity housed at the USPTO serve as a basis for the construction of the indexes.

Specifically, each week the USPTO records the number of patents issued as well as the number of patents maintained, at each of the 4, 8, and 12 year windows. Maintenance “events” represent the volume of the patent options that have been executed. The price for each option is fixed by the USPTO, and does not vary based on the underlying value of the technology in question as is the case in other options markets. However, this fixed price allows us to infer the underlying value of the technology from the volume of patents issued and maintained. Value can be inferred from volume with a fixed price because more inventors are willing to go through the patent process for high-value technology, but less for low-value technology. Thus, averaged over time, patent issuance and maintenance volumes are strong leading indicators of technology values.

Therefore, PVIs are constructed by summing the patent events over time, with more weight given to patents that are maintained later in their lives. Older patents are given more weight because they have less useful life remaining. If a patent owner believes a patent in its twelfth year is worth maintaining, it must be worth proportionately more than a patent in its fourth year, since the patent asset has less life remaining.

Sector Composition

Patent indexes are most useful when they are specific to a given area of technology because most companies’ patent portfolios are built around product or service offerings in one technology sector. For instance, an index on healthcare patents would be a better benchmark for



the healthcare sector than a broader index on all patents. Therefore, some method of determining which patents to include in each index must be found. The simplest method is to use the USPTO classifications for each patent to group it accordingly. However, since there are thousands of class codes at the USPTO and some technologies have mixed usage, it is difficult to include or exclude perfectly. The codes used in the indexes are likely to change modestly over time and so a divisor is added to all of the indexes to accommodate changes to the sector definitions.

Calculation and Dissemination

PVIs are calculated on a weekly basis by IPXI for dissemination within one week after the USPTO releases data relevant to the calculation.

Index Equations

Calculation of the Patent Value Index utilizes the following equation:

$$PVI = \frac{\sum \frac{1 + T/E}{w}}{Divisor}$$

In the PVI equation, T is the time since issuance, and E is the time between issuance and expiry. This gives more weight to maintenance events for older patents. The numerator becomes one in the case of a newly issued patent. W is the number of USPC codes in which a patent is designated. Patents are assigned to a varying number of classification codes; a patent with several associated classification codes is expected to be more broadly useful than a patent with one classification code. In order to avoid subjective judgments about the commercial viability of different USPTO classification codes, each patent is weighted evenly by the number of codes to which it is assigned. The degree to which a given patent is included in the index depends on how many of the codes are included in the sector being analyzed. It is possible to have 7/13th of a patent included in a given PVI index. Issuance and maintenance events are counted and summed over each of the preceding 52 weeks. IPXI's research indicated that 52 weeks is the right size for the trailing window over which maintenance events are summed because it removes distortions associated with shorter spans (seasonal or monthly dips and peaks) while retaining the quality of benchmarking current value.