Who Files Provisional Applications in the United States?

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Abstract
This paper employed the US Patent Application Database to find out who files provisional applications in the United States. Preference rates, use rates, and provisional application to non-provisional application rates were used to evaluate the filing behaviour of provisional applications with respect to non-provisional applications. Factors weighing toward filing provisional applications include filing date sensitivity, patent term sensitivity, and necessity of promoting. Factors weighing against filing provisional applications include cost sensitivity and English abilities. These factors were discussed in order to explain the filing behaviour of provisional applications with respect to non-provisional applications. Applicants form English speaking countries are more likely to file provisional applications than applicants from other countries. We reasoned that the English ability of applicants might be the cause for such a result. Applicants from the fields of Computers and Communications and Drugs and Medical are more likely to file provisional applications than applicants from other fields. We reasoned that patent term sensitivity and filing date sensitivity might be the cause for such a result.

Conference Topic
Patent Analysis

Background and purpose
A provisional application for patent (hereafter referred to as 'provisional application') is a US national application filed in the United States Patent and Trademark Office (USPTO) that has been offered to applicants since June 8, 1995 and was designed to provide a lower-cost first patent filing in the United States. A provisional application is not required to have a formal patent claim or an oath or declaration. Provisional applications also should not include any information disclosure (prior art) statement since provisional applications are not examined. A provisional application provides the means to establish an early effective filing date in a later filed non-provisional patent application (hereafter referred to as 'non-provisional application'). It also allows the term "Patent Pending" to be applied in connection with the description of the invention. A provisional application has a pendency lasting 12 months from the date the provisional application is filed. The 12-month pendency period cannot be extended. Therefore, an applicant who files a provisional application must file a corresponding non-provisional application for patent during the 12-month pendency period of the provisional application in order to benefit from the earlier filing of the provisional application. By filing a provisional application first, and then filing a corresponding non-provisional application that references the provisional application within the 12-month provisional application pendency period, a patent term endpoint may be extended by as much as 12 months. (USPTO, 2014).

Although the provisional application filing approach has been offered to applicants for almost two decades, the USPTO does not make its database of provisional applications publicly available other than the individual files in Patent Application Information Retrieval (PAIR). Therefore, it is still difficult to answer the following two crucial questions: (1) Who files provisional applications in the United States? (2) Why do applicants file provisional applications in the United States?

Dennis Crouch (2008) studied approximately 15,000 utility patents issued in April and May 2008 and found out that only 21% of issued patents claiming priority from a provisional application, only 5% of the patents that associated with a provisional application were assigned to international applicants while 30% of the patents that associated with a provisional application were assigned to a U.S. applicant, Israel and Canada filed the highest proportion of provisional parent claims, only 2% of the Japanese & Korean patents included provisional parent claims, new drug inventions have the highest rate of association with a provisional application, and patents on electrical and electronic applications had the lowest rate of provisional filing. Dennis Crouch provided a rough first look of provisional application filings in the United States, but the dataset used by Dennis Crouch was rather small and time-limited (approximately 15,000 utility patents issued in April and May 2008). Therefore, it seems that the dataset used by Dennis Crouch was not sufficiently large to guarantee the results; and moreover, Dennis Crouch provides the results but lacked to explain the results.

The purpose of this paper is to address the two questions identified with sufficient dataset and detailed analyses to guarantee the results and to fully understand the filing behaviour of applicants. First, we employ the US Patent Application Database for 2005-2013 to find out who files provisional applications by checking the provisional application filings in different countries of origins, technological categories, assignee types, and assignees. Second, we explain why applicants file provisional applications in the US According to the USPTO, most obvious advantages of filing a provisional application are: (1) obtaining an effective filing date with a lower cost and an easily prepared application; (2) extending the statutory patent term up to one year; and (3) the ability to use the term "patent pending" (USPTO, 2014). Therefore, we assume that the following factors are weighing toward filing provisional applications: (1) filing date sensitivity; (2) patent term sensitivity; and (3) the necessity of promoting. Although the provisional application is designed to provide a lower-cost first patent filing in the US, an applicant still needs to spend extra money to file a corresponding non-provisional application in order to obtain a patent. In addition, although the provisional application was supposed to be an easily prepared application as it may be filed in a foreign language, an applicant still requires the English ability to prosecute the provisional application. Therefore, we assume that the following factors are weighing against filing provisional applications: (1) cost sensitivity; and (2) the English ability of applicants.

Trends in filing provisional applications

Since the database of provisional applications is not published, the filing numbers of the provisional applications can only be obtained from annual fiscal reports by the USPTO. Moreover, since the USPTO has never made publicly available the provisional applications that are not relied on for claiming priority by non-provisional applications, we employed the USPTO Patent Application Database to find out the number of provisional applications that have been claimed for priority by at least one non-provisional application.

Figure 1 shows the trends in filing provisional applications. The black bars represent the number of utility applications (non-provisional applications) filed each year from 2005 to 2013; the hatched bars represent the number of provisional applications filed each year from 2005 to 2013; and the grey bars represent the number of provisional applications filed each year from 2005 to 2013 that are relied on as priority documents in non-provisional applications. Please note that the USPTO only reported the number of provisional applications by fiscal year. So in Figure 1, the hatched bars were calculated by the fiscal year (October 1 to September 30), not by the calendar year (1 January to 31 December).

As shown in Figure 1, from 2005 to 2013, over 4.29 million non-provisional applications and over 1.27 million provisional applications have been filed. Among the 1.27 million

provisional applications, over 0.71 million provisional applications have been converted to non-provisional applications. It can be inferred that both non-provisional application filings and provisional application filings continued to rise, with over 570,000 and 170,000 filed in 2013. There was a drop in each of the non-provisional application filings and the provisional application filings in 2009. A possible explanation for such a drop could be attributed to the financial crisis of 2008.

Figure 1 also shows the provisional applications that have been relied on for claiming priority by non-provisional applications. It is observed that the number of provisional applications that have been relied on for claiming priority by non-provisional applications is growing. Although the provisional applications continued to be more popular, applicants have abandoned more of the provisional applications without relying upon them for claiming priority. The difference between each pair of the hatched bar and the grey bar is the number of provisional applications abandoned without being used as priority documents each year.

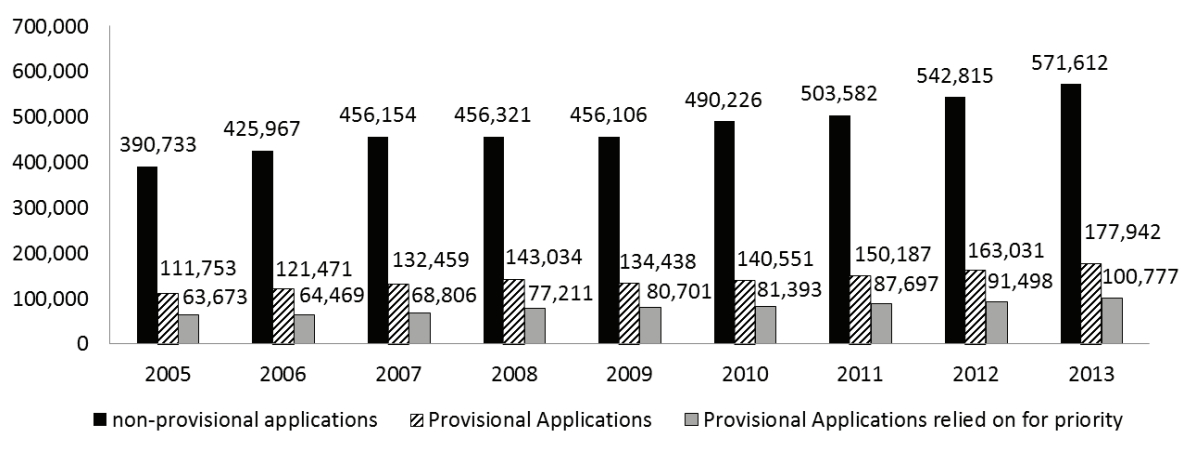

Figure 1. Non-provisional applications, provisional applications, and provisional applications relied on for priority filed each year for 2005-2013.

Rates of provisional applications/non-provisional applications

Rates of provisional applications/non-provisional applications (hereafter referred to as preference rates) show the preference of applicants in filing provisional applications with respect to non-provisional applications. The preference rate represents the percentage of a provisional application being filed in proportion with a non-provisional application in deciding filing patent applications in the United States. In Figure 2, the dotted line shows the preference rate of all provisional applications filed each year from 2005 to2013. It is clear that the preference rate remained steady during the period, except for 2009-2010, and the preference rate continued to slightly rise to 31.13 % in 2013.

Rates of provisional applications relied on for priority /provisional applications

As mentioned above, a provisional application has a pendency lasting 12 months from the date the provisional application is filed. An applicant who files a provisional application must file a corresponding non-provisional application for patent during the 12-month pendency period of the provisional application in order to benefit from the earlier filing of the provisional application (USPTO, 2014); otherwise, the provisional application will be automatically abandoned. Therefore, it is interesting to find out the use rate of the provisional applications that have been used for claiming priority by non-provisional applications (hereafter referred to as use rate). The use rate represents the usage of provisional applications. The result is shown in Figure 2, where the first solid line represents the use rate of all provisional applications filed each year from 2005 to 2013. As shown in Figure 2, the use rate

of provisional applications was located between about 52% and about 60% in 2005-2013, that is, about 40% to about 48% of the provisional applications were abandoned without being converted to non-provisional applications each year during 2005 and 2013.

Rates of provisional applications relied on for priority/non-provisional applications

Rates of provisional applications relied on for priority/non-provisional applications (hereafter referred to PA to NPA rate) show both the filing preference and the usage of provisional applications. The PA to NPA rate can be calculated by the preference rate times the use rate. Since the USPTO has never mad publicly available the provisional applications that are not relied on for claiming priority by non-provisional applications, the PA to NPA rate became the only practical rate for evaluating the provisional application filings with respect to non-provisional application filings in different countries of origins, technological categories, and assignees. As shown in Figure 2, the second solid line represents the PA to NPA rate of all the provisional applications filed each year between 2005 and 2013. It can be seen that the PA to NPA rate remained steady during the period, except for 2009-2010, and it continued to slightly rise to 17.63% in 2013. In other words, approximately one in six non-provisional applications was expected to claim priority upon a provisional application.

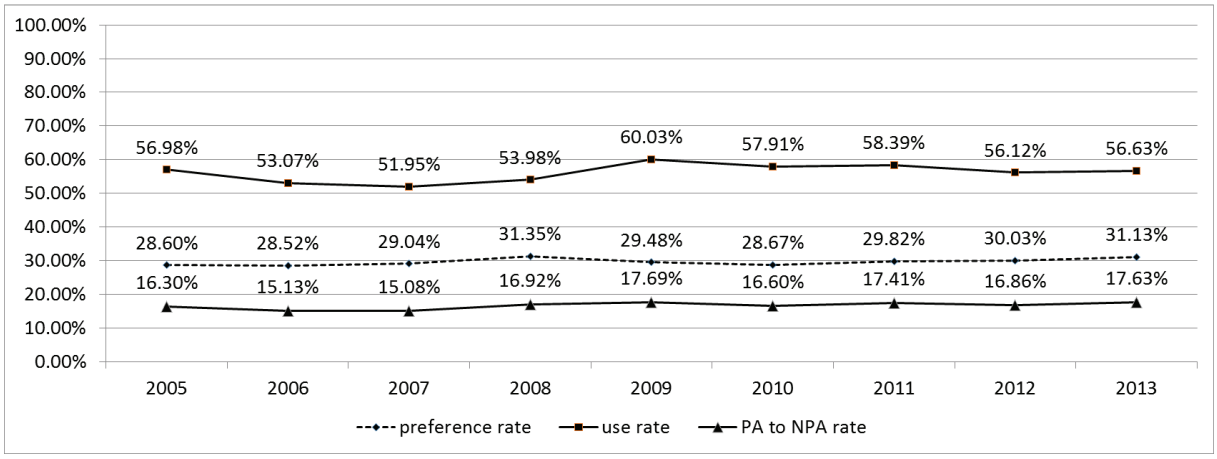

Figure 2. Preference rate, use rate and PA to NPA rate each year from 2005-2013.

Provisional applications by different countries of origins

The date of the filing of the provisional patent application can also be used as the foreign priority date for applications filed in countries other than the United States. Therefore, the need is identified for a foreign applicant to file a patent application as a provisional application in the United States first, and then to claim the priority of the provisional application to file a regular patent application in the United States as well as in the countries other than the United States.

Table 1 shows the ranking of the top 10 countries of origins where applicants filed provisional applications and non-provisional applications in the US in 2005-2013. During this period, the top 10 countries were: United States of America (US), Canada (CA), Germany (DE), Japan (JP), Israel (IL), Netherlands (NL), Korea (KR), Taiwan (TW), France (FR), and Switzerland (CH). It can be seen in Table 1 that the ranking of provisional applications and that of non-provisional applications varied for some countries. For example, JP was ranked second in non-provisional applications but fourth in provisional applications; KR was ranked fourth in non-provisional applications but seventh in provisional applications; TW was ranked fifth in non-provisional applications but eighth in provisional applications; FR was ranked sixth in non-provisional applications but ninth in provisional applications; and CN (China) was

ranked seventh in non-provisional applications but was not ranked in the top ten in provisional applications. It can be concluded that applicants in JP, KR, TW, FR and CN prefer filing their first applications in the United States as regular non-provisional applications rather than provisional applications. On the contrary, applicants in the US, CA and IL very much prefer filing their first applications in the US as provisional applications.

Table 1. Ranking of the top 10 countries of origins where applicants filed provisional applications and non-provisional applications in the US in 2005-2013.

ranking	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
provisional applications	US	CA	DE	JP	IL	NL	KR	TW	FR	CH
non-provisional applications	US	JP	DE	KR	TW	FR	CN	NL	CA	GB

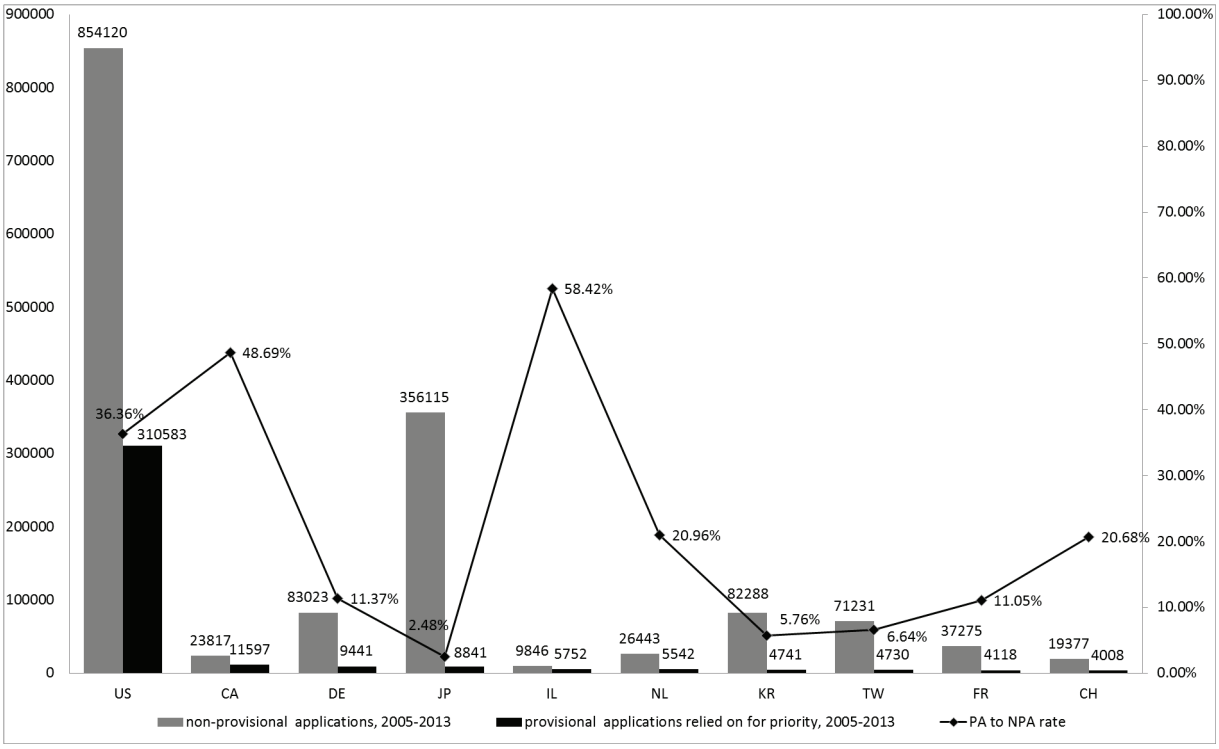

Figure 3. Top 10 countries of origins where applicants filed provisional applications with respect to corresponding non-provisional applications and the PA to NPA rate in the US in 2005-2013.

Furthermore, we checked the PA to NPA rate in order to find out the preference of filing provisional applications for applicants in different countries of origins. Figure 3 shows the top ten countries of origins, where applicants filed provisional applications with respect to corresponding non-provisional applications and the PA to NPA rate in the US in 2005-2013.

In Figure 3, the black bars represent the number of provisional applications filed by applicants from each country in the US in 2005-2013; the grey bars represent the number of non-provisional applications filed by applicants from each corresponding country in the US in 2005-2013; and the solid line represents the PA to NPA rate of each corresponding country in 2005-2013. Figure 3 shows that the PA to NPA rates of the US (36.36%), CA (48.69%) and IL (58.42%) were very much above the average percentage (about 17%). Contrarily, the PA to NPA rates of JP (2.48%), KR (5.76) and TW (6.64%) were far less than the average percentage. We reasoned that the English ability of applicants might be the cause for such a result. Comparing to applicants from JP, KR and TW, applicants from the US, CA and IL are either native English speakers or having good English abilities, so it is relatively easy for applicants in these countries to prepare a provisional application that is suitable for being

relied on for claiming priority by a non-provisional application. Moreover, some foreign laws limit the filing of patent applications abroad before a national patent application filing or authorization occurs. So the PA to NPA rate is expected to be low for applicants from those countries. For example, CN has this kind of law, and its PA to NPA rate was only 2.75%.

Provisional applications by different technological categories

In this paper, we used the six main technological categories (i.e. Chemical, Computers & Communications, Drugs & Medical, Electrical & Electronic, Mechanical, and Others) developed by The National Bureau of Economic Research (NBER) (Hall et al., 2001) to analyse provisional applications by technological categories.

Figure 4 shows the provisional applications relied on for priority filed each year from 2005 to 2013 divided by the NBER main technological categories. As shown in Figure 4, Computers and Communications and Drugs and Medical were the most popular main technological categories, in which applicants filed provisional applications and further converted them to non-provisional applications by claiming priority.

Sukhatme and Cramer (2014) suggested that an applicant who cares about the patent term will seize an opportunity to increase the term if it is offered to him/her. Applicants in industries in which the patent term is especially important would be more likely to file provisional applications than applicants in industries in which the term is less important. In the Drugs & Medical industry, the patent term is critical, i.e. applicants consider the patent term sensitivity, so the applicants tend to extend the statutory patent term up to one year by filing provisional applications first instead of non-provisional applications. In the Computers & Communications category, technologies change rapidly, i.e. applicants consider filing date sensitivity, so obtaining an early effective filing date is important to inventions in this category.

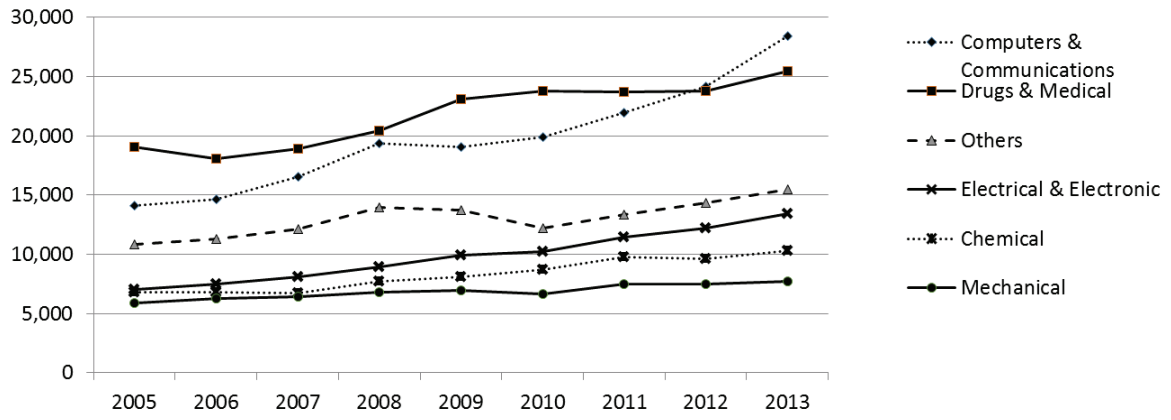

Figure 4. Provisional applications relied on for priority filed each year from 2005-2013, by NBER main technological categories.

Provisional applications by different assignees

Table 2 displays the top ten assignees filing provisional applications that were relied on for priority in the US in 2005-2013. Table 2 also shows the corresponding non-provisional applications by the top ten assignees, and their PA to NPA rates. It is clear that except for Samsung (5.68%) and Microsoft (9.27%), the PA to NPA rate of each of the other assignees was very much above the average percentage (about 17%). Take California University as an example, its PA to NPA rate was up to 81.28%. That is, in about every ten non-provisional

applications, over eight non-provisional applications claimed priority based upon early filing provisional applications.

Table 2. Top ten assignees filing provisional applications that were relied on for priority in the US in 2005-2013, the corresponding non-provisional applications, and the PA to NPA rates.

Assignee	*provisional applications relied on for priority*	*non-provisional applications*	*PA to NPA rate*
Qualcomm	6291	10018	62.80%
California University	3426	4215	81.28%
Broadcom	2876	4963	57.95%
Samsung Electro-Mechanics	2771	48814	5.68%
Koninklijke Philips Electronics N.V.	2519	12386	20.34%
Microsoft	2483	26799	9.27%
DuPont	2429	3286	73.92%
Texas Instruments	2353	5943	39.59%
LG Electronics	2318	9211	25.17%
Apple	1772	5124	34.58%

Table 3 shows main patent areas of each of the top ten assignees. For example, Qualcomm focused on the Computers & Communications field. So among all the 6291 provisional applications that relied on for priority, 5612 applications (about 89%) filed in the category of Computers & Communications. Broadcom, Samsung Electro-Mechanics, Microsoft, Texas Instruments, LG Electronics, and Apple also focused on the field of Computers & Communications.

Table 3. Provisional applications filed by the top ten assignees in the US in 2005-2013 by technological categories.

Assignee	*Chemical*	*Computers & Communications*	*Drugs & Medical*	*Electrical & Electronic*	*Mechanical*	*Others*
Qualcomm	0	5612	0	483	74	106
California University	514	269	1702	716	102	123
Broadcom	0	2264	0	441	0	145
Samsung Electro-Mechanics	0	2187	0	318	0	206
Koninklijke Philips Electronics N.V.	0	852	761	649	53	175
Microsoft	0	1880	0	107	0	474
DuPont	1007	0	509	394	95	374
Texas Instruments	0	1439	0	792	60	0
LG Electronics	0	2041	0	122	0	140
Apple	0	1169	0	429	38	107

It appears that applicants in the Computers and Communications field tend to file more provisional applications than those in other fields. We checked provisional applications that

were relied on for claiming priority filed by the top ten assignees in the Computers & Communications field each year between 2005 and 2013 and all provisional applications that were relied on for claiming priority filed by each of the top ten assignees each year between 2005 and 2013. The result was shown in Figure 5. For all the ten assignees, provisional applications filed in the Computers and Communications field were very close to all provisional applications. It indicates that, applicants in the Computers & Communications field only focused on one field.

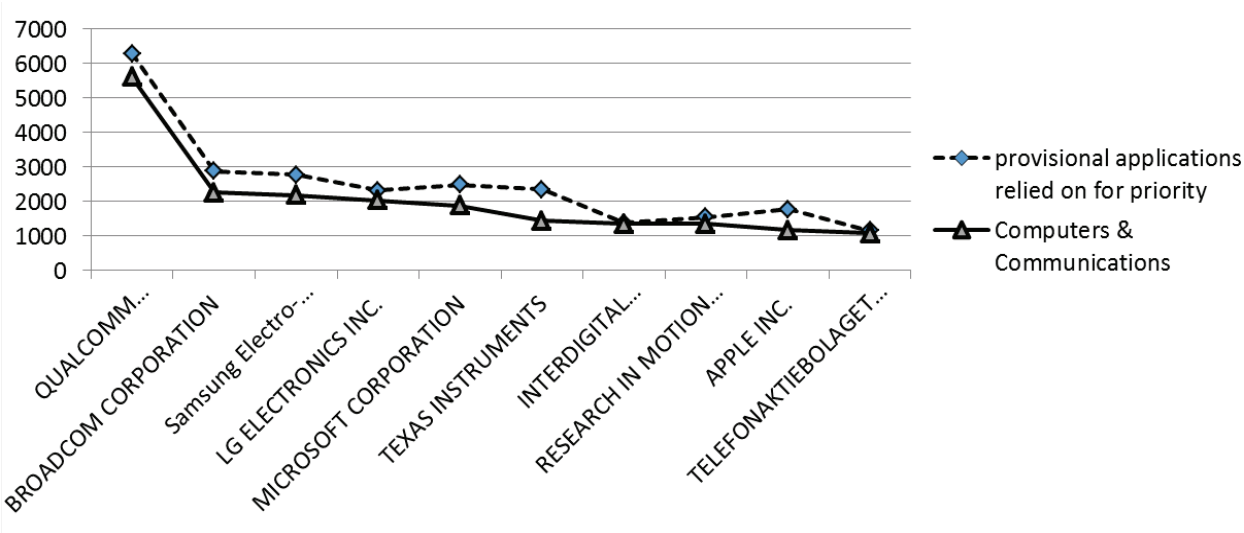

Figure 5. Provisional applications that were relied on for claiming priority filed by the top ten assignees in the Computers & Communications field each year between 2005 and 2013 and all provisional applications that were relied on for claiming priority filed by each of the top ten assignees each year between 2005 and 2013.

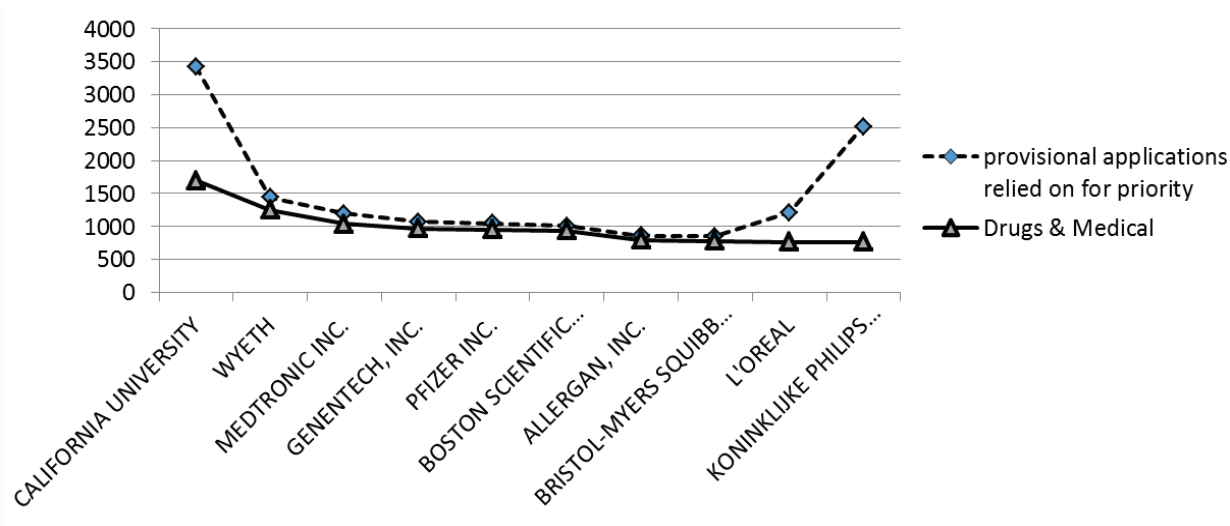

Figure 6. Provisional applications that were relied on for claiming priority filed by the top ten assignees in the Drugs & Medical field each year between 2005 and 2013 and all provisional applications that were relied on for claiming priority filed by each of the top ten assignees each year between 2005 and 2013.

Furthermore, we checked the provisional applications that were relied on for claiming priority filed by the top ten assignees in the Drugs and Medical field each year between 2005 and 2013 and all provisional applications that were relied on for claiming priority filed by each of the top ten assignees each year between 2005 and 2013. The result was shown in Figure 6.

Except for California University and Koninklijke Philips Electronics N.V., assignees filing provisional applications in Drugs & Medical also performed similarly to those in Computers & Communications, i.e. they had less diversity and only focused on one field.

Conclusion

It was found that provisional application filings continued to rise with an increase of non-provisional application filings between 2005 and 2013. The preference rate remained steady with a slight increase. The use rate of provisional applications was about 52% to 60% each year between 2005 and 2013. The PA to NPA rate can be used to evaluate the provisional application filings with respect to non-provisional application filings in different countries of origins, technological categories, and assignees. Filing date sensitivity, patent term sensitivity, and the necessity of promoting were regarded as factors weighing toward filing provisional applications. Cost sensitivity and English abilities were regarded as factors weighing against filing provisional applications.

For provisional applications by different countries of origins, applicants from Eastern Asian countries, including Japan, Korea, Taiwan and China, were less likely to file provisional applications in the US Contrarily, applicants form English speaking countries, including the US, Canada and Israel, were more likely to file provisional applications in the US. Therefore, applicants' English ability might be a major factor that influenced whether or not they would like to file provisional applications in the US.

For provisional applications by different technological categories, applicants in the fields of Computers and Communications and Drugs and Medical were more interested in filing provisional applications in the US.

For provisional applications by different assignees, most of the top ten assignees came from the Computers and Communications field.

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