Expectation and Stock Returns: Evidence from Trademark Applications

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Abstract: This paper tests the hypothesis that companies' trademark applications on an "intent-to-use" basis deliver messages of new developing lines of products in the future. I collect data from USPTO and use fuzzy match techniques to find the trademark applications for each publicly traded firm in the United States. I find stock prices of the applicants are indistinguishable prior to the application but start to diverge in the month following application. Moreover, I show evidence of a strong correlation between the trademark applications behaviours and stock market index returns. My results imply that the applications of trademarks contain important information of stock prices for firms.

1 INTRODUCTION

How does expectation impact a decision? Is expectation biased? These two questions are of general interests to economists in general., and I find trademark application behaviours of public firms are, to some extent, a good opportunity to address these two questions.

Trademark is a recognizable sign, design, or expression that identifies products of a particular source from products of others. Therefore, trademarksare important for product differentiation. However, in contrast to our impression of trademark applications, over half of them are filed on an "intent-to-use" basis, which means to file an application, there is no need to have any existing product in production or sales. The U.S. Patent and Trademark Office (USPTO)--the authority of trademark application and registration– allows a maximum of 36 months before a final decision to register or abandon the mark.

Therefore, an intention to apply for a product mark suggests a company's hope to develop new lines of products. Before application, investors form expectations of a company's future growth rates. After application, a company invests to research, develop, and collect information to determine if they will continue R&D on the product. This decision then translates into a decision to register or abandon the application. This divergence causes heterogeneous shocks to investors of applying companies: positive shock to investors of those registering applicants and negative shocks to investors of abandoning applicants. Do stock prices move accordingly?

If expectation is incorporated into a stock price, then there is no difference between the two types of companies before a trademark application, and following the application, stock prices should move in line with the type being revealed when uncertainty is gradually resolved.

To answer the second question of expectation bias, I first build an illustrative model which is necessary because the impacts of expectation bias are mixed with shocks to different types. The model predicts that the average abnormal return to trademark applicants will deviate from zero if the expectation is not rationally formed. In particular, negative abnormal returns on a high type implies huge optimism and positive returns on low type implies huge pessimism. My results suggest that there is considerable optimistic expectation bias across firms and over time on average, even causing negative returns for registering applicants.

My research mainly contributes to three fields of research. First, this paper is related to research in behavioral finance such as Abarbenell and Bernard (Abarbenell, Bernard, 1992) Amronin and Sharpe (Amronin, Sharpe, 2013), Hirshleifer and Yu (Hirshleifer, Yu, 2012), Greenwood and Shleifer (2014), Gennaioli *et al.* (2015) and Barberis *et al.* (2018) which find that investor expectations are

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extrapolative. Barberis (Barberis 2003) provides a good handbook of behavioral finance topics. Many of them use survey data of investors, CFO/CEOs and analysts[1]. However survey expectations can suffer from measurement error problem. Greenwood and Shleifer's (Shleifer 2014) paper suggest survey expectations of future returns are low in recessions which seems controversial as surveyees may misunderstand the survey questions. Instead of studying the expectation itself, I study the ex post responses to the expectation formed earlier when information is gradually available to resolve uncertainty. In particular, the ex post outcome is binary and identifiable in my setting: a company either registers or abandons the application. Most of existing research relies on the argument that a rational expectation predicts that the average stock returns are zero even though the high type are faced with positive shock and low type are faced with negative shocks. This binary division of types via application outcome lends researchers another lens to study the impacts of expectation bias.

Second, my research is also related to stock return reversals. In general, I find a negative 1-year return predictability around trademark applications. Jagadeesh (Jagadeesh 1990) and Lewellen (Lewellen 2001) are examples that show negative short-horizon autocorrelation of returns. Explanations of "reversal"/"momentum" are broadly divided into overreaction and underreaction. My results point to overreaction in explaining a 1-year reversal of stock returns. The "overreaction"/"underreaction" can also be rephrased as "optimism"/"pessimism". The former behaviour pair refers to investors' reactions to any news about the prospect of the stock. The latter sentiment pair describes investors' attitudes towards uncertain futures. My study shows the second type; when information is not enough to resolve uncertainty, investors tend to overestimate future growth rates, and stock prices start to diffuse when uncertainty is resolved. It is worthwhile to emphasize that the 1-year negative autocorrelation is augmented when there are trademark application events. It suggests that trademark application initiates an important period of information release.

The last contribution of my research is enhancing people's understanding of trademarks. Compared to patents, the value of trademarks are small and ambiguous, and the innovation behind a trademark is lower (Krasnikov, 2009, Schmoch, Gauch, 2009). It is not surprising. Patents exclude rivals from using the technology such that they are totally prohibited from entry to the market. Trademarks, however, mostly lead to horizontal differentiation of products and add marginal value to a firm. Hsu *et al.* (2018) used the similarities of trademark portfolios among firms to study a firm's intention to merge and the resulting impacts on industry competition. My results are supposed to draw the attention of researchers to another important yet ignored dimension of trademarks: the expectations of future growth.

In the sections to follow: section 1 describes the trademark data set; Section 2 shows the sample selection and summary statistics; Section 3 is a simple model that illustrates the impact of expectation bias on stock returns; Section 4 provides empirical evidence for the model at both the aggregate and firm levels; Section 5 concludes.

2 DATA DESCRIPTION

2.1 Trademarks

The USPTO is an agency mostly known for issuing patents for inventions to inventors and businesses. Another important, but often forgotten role, is that they also issue trademark registration for product and intellectual property identification. Trademarks are important for product differentiation via a form of recognizable sign, design, or expression that identifies products of a particular source from those of others[2]. Therefore, companies with profitable products have an incentive to register a mark for their product so that they can enjoy the exclusive benefits of their product and identify against their rivals.

For the purpose of this research, I will only focus on applications with two distinctive features: (1) applications that signal new product lines and (2) applications for products that have uncertain prospects. The first feature leaves a task to filter out trademarks that are not related to specific products or are for advertising/marketing purposes. The previous points to logos that can be used for any of a company's products; the latter case is advertising slogan or redesign of the slogan. Even though USPTO does not directly provide a classification of product versus marketing, the datasets provided by

[1] Gennaioli *et al.* (2015) provides a good comparison among them

[2] There are also service markers, but their percentage in the dataset is small . I will only focus on those about products.

USPTO[3] allow researchers to determine a product mark from a marketing mark. Following Hsu et al. (2017), this research relies mainly upon two sources of information to determine if a trademark is related to specific products: drawing code and identification character. In general, the trademark should have a moderate amount of textual content and the text of the mark should be relatively novel. (See Appendix 1 for details of the classification scheme.)

I am also interested in trademark applications because they express companies' intentions to invest. In general, there are two legal bases of applications: "intent-to-use" and "in-use" [4]. "Intent-to-use" applications can be filed when there is no product, but applicants must file a declaration stating that they have a bona fide intent to use the mark in commerce. To file under the use basis, the owner must submit a declaration stating that, as of the filing date, the mark is used in commerce. The first option has only been available since November 1989. An applicant filing based on intended use cannot obtain registration until (a) the mark is actually used in commerce, (b) a verified statement or declaration to that effect is filed, and (c) a specimen of use is submitted. By default, there is a 6-month window for the applicant to file a Statement of Use (SOU). The applicant may request up to five six-month extensions for filing the SOU, making the effective deadline for establishing use up to 36 months. If the owner fails to establish use, the application is treated as abandoned. Furthermore, unlike patents, the review of trademark applications is simple: (1) procedural matters such as proper identification of the products and (2) the applicant's mark is not merely descriptive or likely to cause confusion with a preexisting applied-for or registered mark. With these said, for "intent-to-use" applicants, they play an active role in the process-the decision to apply and the decision to exit. Therefore, behaviors engaged in trademark applications imply much about a company's expectations of future growth and how they adjust to new information after the application.

2.1.1 Example: Apple Inc

One good case study about trademarks is Apple Inc., the world famous technology company that designs, develops, and sells consumer electronics, computer software, and online services. Its website[5], has an non-exhaustive list of 286 active and registered trademarks owned by Apple Inc., and I matched about 80 % of them by name with the data set from USPTO[6]. Additionally, using USPTO's trademark data set, I found 973 applications made by Apple Inc. since 1977. 66.5% are for new products, 59.5% are filed on the basis of "intent-to-use," and 18.8% are abandoned.

In the pool of applications made by Apple Inc., there are strong examples to show the difference between: (1) a marketing trademarks and production trademarks; (2) an "intent-to-use" and "In-Use" application; and (3) registered applications and abandoned applications. In Appendix 2, I have a list of sample trademark applications made by Apple Inc. Except for those well know logos and brands, for example iPhone 6 and iPod, there are also many attempts on products that are eventually abandoned, for example the "Premium Reseller" and "X-Ray". The case of applying for a trademark for the first iPod in 2001 is a good example of "intent-to-use". Though the iPod was released in 2001, its price and Mac-only compatibility caused sales to be relatively slow until 2004. The final registration of the trademark was in April of 2004. So what concerns the applicant of trademarks is not only product development out of an idea or technology, but also sales and profits.

Apple Inc.'s history of trademark applications (Appendix) is typical for public firms. First, in the early stage of the company, they devote more effort to the research and development of new products, and in later stages they focus on marketing and advertising to shape their corporate image. Second, when firms have developed, they become more aggressive/encouraged to develop new products and apply for "intent-to-use" trademarks to seize the opportunity for any potentially profitable projects.

3 RESULT

3.1 Summary Statistics

Since I will use the sample of intent-to-use applications among public firms, I want to have an overview of their patterns. I compare the time series of public firms' trademark applications growth rate of intent-to-use (ITU) applications with a set of aggregate level variables. I conduct pairwise comparisons in Figure 1 and also show the correlation matrix in Table 1. Grow rates or returns are

[3] https://www.uspto.gov/learning-and-resources/electronic-data-products/trademark-case-files-dataset-0

[4] See Graham et al. (2013) for more details.

[5] https://www.apple.com/legal/intellectual-property/trademark/appletmlist.html

[6] The unmatched can result from little difference in names.

logarithmized and over 12-month period: growth(x) =100*[ln(X_t) - ln(X_{t-12})] where t is the month.

First, I compared it with the ITU growth rate of all applicants (both public and private). They have very similar patterns and a correlation coefficient of 0.8. The most stark

disparity is in the period of the "dot-com bubble" between 1995-2000. The public companies are less aggressive in filing applications than private companies. Otherwise, the magnitudes and patterns of the two time series are very similar. This suggests that even though the matched sample of public companies only contributes to 14% of the applications, it is a representative sub-sample. Second, I compared it with SP500 index total return, and the two are highly correlated with coefficients of 0.6. Companies tend to file more trademarks in times of bull market. I also check if the growth rate predicts future SP500 return and find insignificant correlation. Third, I compared it with the growth of in-use applications in the same sample of public firms. There are co-movements, but the growth of intent-to-use is more volatile and has higher correlation with the prior 12-month stock market performance. Fourth, I wanted to check if a higher growth rate was followed by lower probability of registration. There is no evidence for this. However, registration rate is associated with future performance.

This summary is a prelude of the empirical studies to follow. It does not provide strong support to a story of expectation bias and diffusion around trademark applications. Therefore, I need more thoughtful empirical design to disentangle the effects from these other noises.

3.2 Correlation with Market Index Return

For my empirical studies, I also used the SP500 index total return, monthly stock return data from CRSP, and returns to factors from Kenneth French's Data library[7]. Returns were value-weighted when there are multiple stocks (permno) for one company (permco). Also, consistent with most empirical asset pricing research, I deleted stocks whose price is below five dollars a share (for example, Jegadeesh and Titman 2001, Lou 2012) to address potential micro-structure issues. Moreover, I used the logarithm of returns.

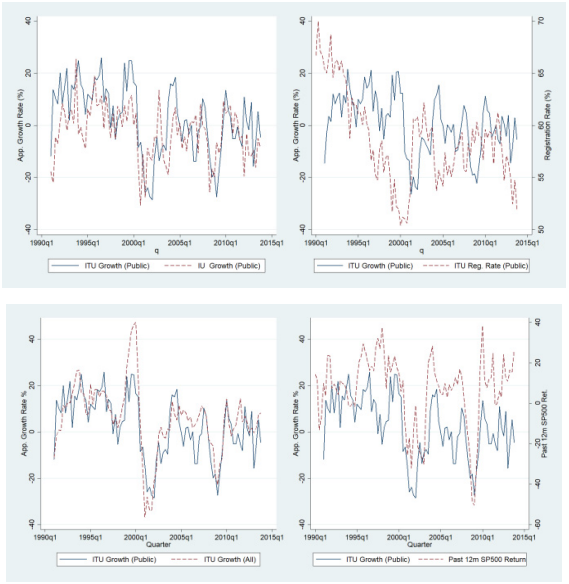

Figure 1: Public firms' intent-to-use application growth and other variables in the time series.

There are five variables in these figures: the growth rate of intent-to-use (ITU) applications by public firms; the growth rate of intent-to-use (ITU) applications by all firms; the growth rate of in-use (IU) applications by public firms; the rate of registration of ITU applications by public firms; the past 12-month SP500 index total returns. I compared pairwise between the first and the other four variables in four figures, and I plotted the data in quarterly frequency–each point presents the quarter-end month value. Rates and returns are in percentages.

4 CONCLUSION

A company filing trademark applications on an "intended use" basis conveys a message of developing a new product line. After an application, the effect is gradually visible. This research determined that an applicant's stock price was indistinguishable prior to application, but disagreements began to emerge within a month of the application. In addition, the number of trademark application filings is positively associated with the market index returns. My findings support that trademark applications contain valuable information for stock pricing. To a certain extent, the effect of trademark registration measures the innovation degree of a company's new product. The difference

[7] Kenneth French's Data library.

between a trademark and a patent is that the object and content of their protection are different.

The findings in the paper also pave the way for future explorations. I can construct the tradeable portfolio holding companies that have recently filed trademarks. I can check if they can generate exceptional returns which cannot be explained by a six-factor model. If the risk-adjusted returns are negative, it can support the optimistic expectations bias and may help explain short-term reversals in equity returns.

Table 1: Correlation and Summary Statistics.

Panel A: Correlation Matrix						
	Growth (ITU,Public)	Growth (ITU, All)	Growth (IU,Public)	Reg. %	Past 12m Stock Ret.	Future 12m Stock Ret.
Growth (ITU,Public)	1					
Growth (ITU,All)	0.800*	1				
	(0.00)					
Growth (IU, Public)	0.552*	0.603*	1			
	(0.00)	(0.00)				
Registration %	0.039*	-0.103	0.104	1		
	(0.71)	(0.33)	(0.32)			
Past 12m Stock Ret.	0.590*	0.595*	0.384*	-0.108	1	
	(0.00)	(0.00)	(0.00)	(0.30)		
Future 12m Stock Ret.	0.116	0.083	0.103	0.233*	0.097	1
	(0.27)	(0.43)	(0.33)	(0.02)	(0.02)	

Panel B: Summary Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
Growth (ITU,Public)	92	2.41	13.36	-28.50	25.89
Growth (ITU, All)	92	5.81	15.06	-36.70	47.28
Growth (IU,Public)	92	-2.63	10.21	-30.67	25.47
Registration %	96	58.68	4.36	50.43	69.96
Past 12m Stock Ret.	96	6.79	17.57	-50.55	38.23
Future 12m Stock Ret.	96	7.40	17.48	-50.55	38.23

There are six variables in these figures: the growth rate of intent-to-use (ITU) applications by public firms; the growth rate of intent-to-use (ITU) applications by all firms; the growth rate of in-use (IU) applications by public firm; the rate of registration of ITU applications by public firms; the past 12-month SP500 index total return; and the future 12-month SP500 index total return. The first panel of their correlation coefficients and p-values are shown in brackets (Significance level:* 95%). The second panel provides a summary of statistics of the six variables. I only keep quarter-end month values, resulting in a time series of quarterly frequency for each variable. Rates and returns are in percentages.

APPENDIX

The following table lists detailed information of five typical trademark applications made by Apple Inc.. The information is extracted from USPTO case file and USPTO trademark search system.

Table:Examples of Trademark Applications by Apple Inc.

Serial No.	Type	Legal Basis	Filing Date	Reg. / Aban. Date	Logo / Name
73120444	Marketing	In-Use	25/03/1977	29/11/1977	
86501818	Product	In-Use	13/01/20	09/08/2016	IPHONE 6

99			15		
75982871	Product	Intent-To-Use	18/10/2001	27/04/2004	IPOD
85179361	Product	Intent-To-Use	17/11/2010	04/05/2015 (Abn.)	PREMIUM RESELLER
77099170	Product	Intent-To-Use	05/02/2007	20/11/2008 (Abn.)	XRAY

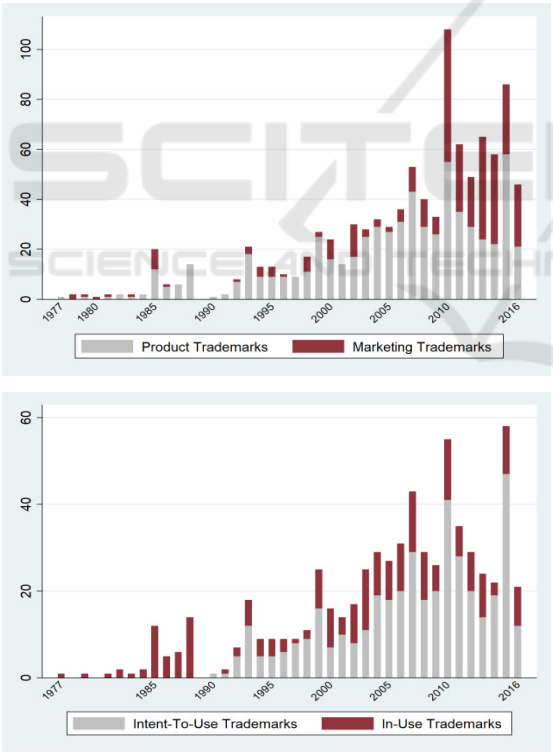

Figure 2: Apple Inc.'s Yearly Number of Trademark Applications By Type and Legal Basis.

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