PROFITIBILITY AND ROYALTY RATES ACROSS INDUSTRIES: SOME PRELIMINARY EVIDENCE

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ABSTRACT

Is the licensing market efficient such that royalty rates reflect the costs and profitability across industries? This paper tries to answer the question through exploring the relationship between royalty rates and profitability. Our analysis shows that the reported royalty rates across industries do not converge with the rates generated by the 25% rule, although they tend to fall between 25% of gross margins and 25% of operating margins. Regression analyses indicate that there is a linear relationship between the reported royalty rates and various profitability measures, which suggests that the licensing market is efficient and that cost structure and profitability across industries have been factored into royalty rate negotiation. Therefore, the 25% rule is simply a special case of such a general linear relationship. A revisit to the data in Goldscheider et al (2002) further demonstrates that, a "forced" linear fitting seems to make the average royalty rate equal to 23% of the operating profit margins, rendering indirect support to the 25% rule. However, such a conclusion should be taken with caution, because no general linear relationship was found between the reported royalty rates and operating margins as defined by Goldscheider et al (2002).

Keywords**:** *Royalty rate, profitability, the 25% rule, regression analysis, linear relationship, industry, royalty negotiation, profit margin.*

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1. INTRODUCTION

Royalty payments can be interpreted as a profit sharing mechanism. In other words, by receiving royalty income, a technology licensor shares the profit streams generated from the licensee's efforts in commercializing the patented technology. Royalty rates in a majority of license agreements are defined as a percentage of sales or a payment per unit. However, the profitability of the products or services that incorporate the patented technology plays a dominant role in royalty determination. According to a survey published by Degan and Horton (1997), when asked what financial measures they used in determining royalty amounts, more than half of the survey respondents listed discounted cash flow or profit sharing analysis, while nearly a quarter used the 25% rule as a starting point.

This paper explores the relationship between profitability and royalty rates across industries[1]. We will answer two questions in patent licensing. First, do reported royalty rates across industries, on average, converge with the rates generated by the 25% rule? Second and more generally, is the licensing market efficient such that reported royalty rates reflect the profitability across industries? Intuitively, the higher an industry's profitability, the higher the royalty rate. If a linear relationship exists between profitability and the reported royalty rates, the 25% rule is simply a special case of such a general linear relationship.

Our analysis of the data shows that reported royalty rates across industries do not converge with the rates generated by 25% rule at an industry level, although the reported rates tend to fall between 25% of the gross profit margins and 25% of operating profit margins. Our analysis also indicates that EBITDA may be a reasonable base for applying the 25% rule.

Regression analyses using industry data further demonstrates that, generally, there is a linear relationship between reported royalty rates and various profitability measures. Specifically, the reported royalty rates account for 15%, 41%, and 54% of gross, EBITDA, and EBIT margins, respectively. Such a linear relationship suggests that the licensing market is efficient and cost structure and profitability across industries have been factored into the royalty rate negotiation. The 25% rule is simply a special case of such general linear relationship.

Does this mean that the 25% rule is invalid? The answer is no. We agree with many authors that the 25% rule serves a good starting point for royalty negotiations. Also, based on our analyses on the data published in Goldscheider, et al. (2002), a "forced" linear fitting seems to make the average royalty rate equal to 23% of the operating profit margins, indirectly supporting the 25% rule. However, such a conclusion should be taken with caution because no linear relationship was found between the reported royalty rates and operating margins as defined by Goldscheider, et al. (2002).

The rest of the paper is structured as follows. First in Section 2, we will briefly review the literature, especially the most recent efforts by researchers and practitioners in studying the 25% rule. The scope of this research is also defined in this section which mainly highlights the differences between this paper and the earlier ones, specifically Goldscheider, et al. (2002). Section 3 describes the data issues and discusses certain important issues in calculating profitability measures. Section 4 presents the data analyses to determine if reported royalty rates across industries converge with the rates generated by the 25% rule. Sections 5 and 6 report regression analyses on the reported royalty rates against various profit margins. Finally, Section 7 discusses the implications of the results and highlights issues for further research.

2. LITERATURE REVIEW AND RESEARCH SCOPE

2.1 Literature Review

Discussions about profitability and royalty rate determination have generated a large pool of literature. In most intellectual property ("IP") related books, such topics are addressed in at least three places: the

[1] Throughout the paper, royalty rate is defined as a fixed percentage rate of sales.

Georgia-Pacific factors, the income approach for IP valuation, and the 25% rule. The discussions usually offer general guidelines and qualitative descriptions about the importance of profitability without much analytical elaboration (let alone empirical evidence).

It is the persistent interest in the 25% rule from IP researchers and practitioners that has advanced the understanding of the relationship between profitability and royalty rate. The 25% rule, as defined by Goldscheider, et al. (2002), "suggests that the licensee pay a royalty rate equivalent to 25 percent of its expected profits for the product that incorporates the IP at issue". Over the years, this rule has gained popularity as a good starting point for royalty negotiations, thanks to its simplicity, intuitive reasonability, and the keen advocacy from well-respected authors including Goldscheider and Razgaitis. Goldscheider first wrote about the rule in the 1970s. Since then, there have been numerous publications focusing on the 25% rule, among which the most recent ones include Goldscheider (2001), Goldscheider, et al. (2002), and Razgaitis (1999, 2002).

Not surprisingly, the 25% rule has also encountered criticism for its one-size-fits-all nature, seeming oversimplification, and failure to consider many important factors in royalty rate determinations. A complete review of major criticisms can found in Goldscheider, et al. (2002). Most recently, Hagelin (2004) pointed out several other problems arising from application of the rule, including profit measurement, cost inclusion, and contributions of non-infringing assets.

In the wake of criticism, the recent research regarding the 25% rule has refocused on two new areas. First, there have been efforts to generalize the rule, which would imply that the name of "the 25% rule" simply means a general rule of thumb associating royalty rates with operating profit. The rule might better be referred to as the 25% to 33% rule, as suggested by Razgaitis (2002). Grandstrand (2006) offers another way to support the 25% rule. According to his model, the rule is simply a special case of his general model, by which licensor's share of profits equals its share of total investment in bringing the technology into commercialization. In other words, when a licensor's share in total investment is 25%, his model becomes the 25% rule.

Second, the recent research has turned to empirical evidence to seek further justification for the 25% rule. Razgaitis (2002) pointed out that the actual percentage can vary a great deal. For software and content licensing, it could be as high as 50%. Jousma (2005) analyzed royalty determination in the pharmaceutical industry and concluded that the 25% rule can be a good starting point for a start-of-phase I deal. For the deals commencing at start-of-registration, 50% is more reasonable, while rates for start-of-phase II and III transactions are about 33% and 40%, respectively.

The most comprehensive study, conduced by Goldscheider and his co-authors, was first published in Les Nouvlles in 2002 and was later included in Parr and Smith (2004) and Parr (2007). In this now well-cited study, Goldsheider, et al. concluded that based on the royalty rates reported by RoyaltySource, the median rate of 347 licensee companies converges with the rate generated from applying the 25% rule to the weighted operating profit margins of the same group of companies.

2.2 Research Scope

While we also address the 25% rule as part of our efforts to explore a generic relationship between profitability and royalty rates, our paper expands the research scope beyond that of the existing literature. First, the main purpose of this paper is not to test the validity of the 25% rule. Instead, it aims at answering a more fundamental question: is the licensing market efficient such that the reported royalty rates reflect the cost structures and profitability across various industries? Since the reported royalty rates are defined as a fixed percentage of sales, it is especially interesting to see whether royalty negotiations have factored in the cost and profitability characteristics across industries.

Second, our research focuses more on the industry pattern, not a simple aggregate of individual companies as in Goldscheider, et al. (2002). In other words, we focus on exploring the pattern of royalty rates and profitability across industries in an effort to gain the insight of the relationship between the pair.

Finally, instead of using only one profitability measure, namely, operating profit, our paper calculates three different profit margins for all industy sectors studied. Our goal is to examine the general relationship between royalty rates and profitability and to investigate how the royalty rates are associated with various profitability measures.

3. DATA DESCRIPTION AND PROFITABILITY MEASURES

3.1 Data Description

Industrial classification

The royalty rate data by industry used in this paper is from RoyaltySource of AUS Consultants and the company financial data from CompuStat. RoyaltySource reported royalty data for 15 industries on its publication the Licensing Economics Review ("LER"). It is important for us to classify the companies in the same way as RoyaltySource does, because RoyaltySource's classification is different from other standard classifications such as the US Government's SIC and NAICS or those used by private data vendors like Standard and Poor's. Therefore, simply matching RoyaltySource's classification with others could lead to completely mismatched data, rendering the research outcome meaningless.

This paper adopts the classification as reported by the RoyaltySource, but reduces it to 14 industries by combining the internet and software sectors.[2] The company list was generated at the 4-digit SIC code level by querying CompuStat. The query yielded a total of 3,887 companies that match RoyaltySource's classification.[3] Individual companies are then mapped into 14 industries. The industry names and corresponding 4-digit SIC codes are reported in the Appendix.

Royalty Rate Data

The royalty data calculated by RoyaltySource is published annually in the December issue of LER. The most recent survey was published in December 2007, which was calculated from a sample of 3,015 transactions collected over a 21-year period. The transactions are then classified into 15 industries. Two industries, health/medical products and pharmaceuticals, account for nearly half of the transactions, while media and entertainment have only 43. For further details, refer to the December 2007 issue of LER.

Financial Data

Financial data are retrieved from CompuStat, and ratios and percentages are calculated. Average profit margin is calculated as an arithmetic mean of the profit margins of all companies in the sector with data available, in an effort to alleviate the effects of large companies possibly caused by the sales-weighted profit margins. A significant number of companies in each industry report negative profit margins, especially EBIT margins. After balancing potential negatives and positives, we decided to truncate the samples by excluding all companies with negative margins.[4]

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[2] We did this for two reasons. First, internet companies major assets are software to operate the internet business model, any in- or out-licensing may well involving software technology. It is hard to imagine that eBay or Amazon or Yahoo may license significant other technology besides software. Second, separating internet from software business would make it hard to classify a company whose business is selling software through internet.

[3] The authors want to thank Mr. David Weiler of AUS Consultants for explaining to us the RoyaltySource's classification. He actually went through the classification with one of the authors in great detail. However, any errors or mistakes in matching the companies with the RoyaltySource classification are ours.
Based on our discussion with Mr. Weiler and our understanding, we include only manufacturing companies or services companies, not service outlets. For example, while we include food processing companies, we did not include restaurants. By the same token, apparel producing companies are included, but supermarkets such as JCPenny and Dillards are excluded.

[4] Truncating data this way can be justified in practice. Specifically, according to the 25% rule, licensees would not pay negative royalty to licensors. Generally, since our goal is to examine the relationship between royalty rate and profitability, associating royalty rates with negative profit margins would distort the relationship, as will be seeing later in this paper.

3.2 Profitability Measures

Profit margins at company level vs. at the product level

To better explore the relationship between royalty rates and profitability, profit margins need to be calculated at product level for the specific product that incorporates the licensed technology. Again, it is virtually impossible in practice to compile the data for profitability analysis at the product level. Companies usually produce dozen or even hundreds of products, and they are usually reluctant to disclose financial data at the product level, even if they internally compile such data.

As a result, we use profit margins at the company level as a proxy, based on several important considerations. First of all, over the product life cycle, profit margins will typically swing significantly, from negative initially, to higher margins when sales are rising, and eventually flatten out and even decline toward negative when the market saturates. Therefore, over the life cycle, a product's profit should converge to the company average margin. Industry-wide, competition would ultimately drive away any price premium and/or cost advantage a product enjoys, making the product profitability revert to industry average.

Gross margin vs. operating profit margin

The last issue is what profitability measure shall be used for our study. According to accounting and financial reporting principles, there are three major profitability measures. Gross profit is measured as sales less direct manufacturing costs that include mainly raw materials, direct labor costs, and other costs directly associated with production. Operating profit equals the gross profits less operating costs such sales, marketing, and general administrative ("SMGA"), and R&D costs. Operating profit with depreciation and amortization costs subtracted is called earnings before income tax or EBIT, and before such subtraction, referred as earnings before income tax, depreciation, and amortization or EBITDA.

Since most patented technologies are utilized to either increase sales volumes or reduce direct costs, it is reasonable to associate gross profit with the royalty rate. However, as pointed by Parr (1999) and Parr and Smith (2000), operating expenses and operating profits certainly play important roles in determining royalty rates. For example, a patented technology ready for incorporation into an existing manufacturing process shall command a higher royalty rate than a similar one that requires large spending in further R&D.

If operating profit is relevant, which shall be used, EBIT or EBITDA?[5] Compared to EBIT, EBITDA, which includes two non-cash items of depreciation and amortization, is a better indicator for value creation. It is also neutral to capital intensity, and without including depreciation and amortization, is more immunized to potential accounting manipulations such as depreciation method and useful life estimates.[6] EBIT measures net profitability before interest and tax and is immunized to capital structure and financing method. However, it is more sensitive to capital intensity and accounting methods.

We calculated all three profitability measures based on the historical data from CompuStat[7] and will discuss their relationships with the reported royalty rates in the rest of this paper.

[5] When introducing the 25% rule, most authors used loose terms such as "gross profits, before tax", "operating profits", or "pre-tax profitability" (see Razgaitis (2002), Goldscheider (2001), Goldscheider et al (2002), Parr and Smith (2000), Parr (1999), and Battersby and Grimes (2001)).

[6] The argument that all other things being equal, a patent incurring less initial capital investment should command a higher royalty rate than the one requiring more initial investment, is not valid. In an efficient market, if a less capital-intensive alternative exists, the more one will have no market share, unless the more capital-intensive one is superior so that net PV is positive for the licensee. However, the superiority violates the condition of "all other things being equal".

[7] It is worth to pointing out that theoretically, expected margins shall be used, instead of historical, for royalty rate research, because in licensing negotiation, the focus is on expected margins. However, for the purpose of research, we would have to use historic margins.

4. ROYALTY RATES AND THE 25% RULE ACROSS INDUSTRIES

4.1 Reported Royalty Rates and the Rates Implied by the 25% Rule: The Big Picture

Table 1 shows the average profit margins for all of the companies with data available for margin calculation, out of the 3,887 companies. It also compares the royalty rates implied by the 25% rule with the average rates reported by RoyaltySource.

TABLE 1: PROFIT MARGINS, RATES FROM THE 25% RULE, & REPORTED ROYALTY RATES

	Gross Profit Margin	EBITDA Margin	EBIT Margin	3-Year Average Gross Profit Margin	3-Year Average EBITDA Margin	3-Year Average EBIT Margin
Average Profit Margin	46.5%	18.6%	13.7%	46.0%	17.7%	13.2%
25% of the Average Profit Margin	11.6%	4.7%	3.4%	11.5%	4.4%	3.3%
Reported Average Royalty Rate	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Median Profit Margin	45.0%	14.3%	10.9%	44.2%	13.7%	10.5%
25% of the Median Profit Margin	11.3%	3.6%	2.7%	11.1%	3.4%	2.6%
Reported Median Royalty Rate	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%

Several observations can be made. First, applying the 25% rule to the average operating profit margins would imply a royalty rate of 3.3 % to 4.7%, while the average rate reported by RoyaltySource is 7%. Similarly, 25% of median operating profit margins points to royalty rates of 2.6% to 3.6%, as compared the median reported rate of 5%.

Second, taking 25% of gross margins, both average and median, yielded a relatively stable royalty rate of 11%.

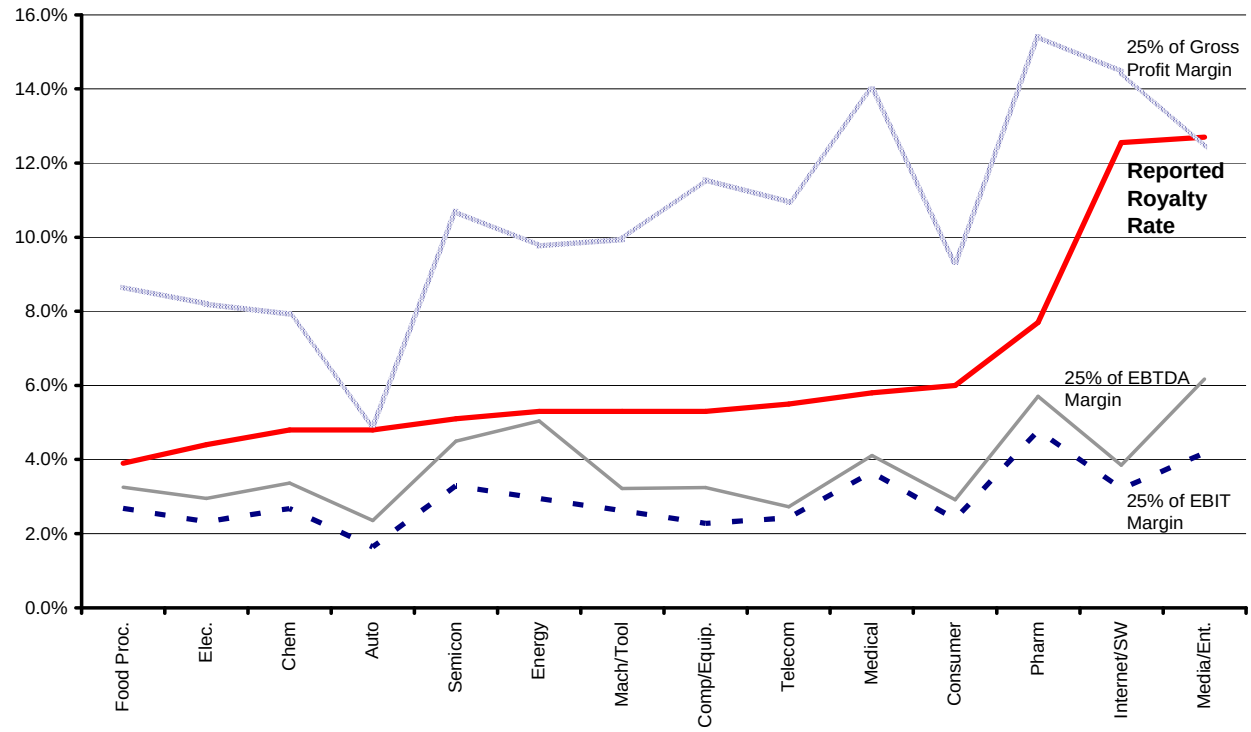
Third, at the aggregate level, the reported royalty rates fall between 25% of operating margins and 25% of gross margin. More precisely, the rates from taking 25% of EBITDA margins seem to best approximate the reported royalty rates, as compared to the rates generated from applying the rule to gross margins and EBIT margins.

In Table 1, we report both average and median rates, as well as one year rates and three-year average rates. As Table 1 shows, using median and three-year average rates does not significantly alter the conclusions reached so far. Therefore, in the rest of the paper, we will base our analyses on only the average rates and margins.

Industrial Profile: Royalty Rates and Profitability across Industries

Chart 1 illustrates the industry pattern of reported royalty rates and the rates calculated by the 25% rule. The chart adds further evidence to the conclusions reached in section 4.1. For example, across 14 industries, reported royalty rates generally fall between 25% of the operating margins and 25% of the gross margins. In other words, 25% of gross margin serves as an upper bound for the reported rates, while the 25% of EBIT margins provides a lower bound.

CHART 1: REPORTED ROYALTY RATES VS. RATES FROM THE 25% RULE



Also, across 14 industries, the rates generated from 25% of EBITDA margins are persistently closer to the reported rates, implying that the EBITDA margin may be a better base for using the 25% rule. We mentioned in Section 3.2 that since EBIT margin is sensitive to capital intensity and may be subject to accounting manipulations, EBITDA margin should be more consistent and reliable. However, Chart 1 does not support this proposition at the industry level because the rates generated by applying the 25% rule to EBITDA and EBIT margins fluctuate closely and persistently across industries.

Finally, the rates calculated from applying the 25% rule to operating margins are significantly below the reported rates for industries such as internet/software and media. This seems to corroborate Razgaitis (2002), who concludes that the actual percentages to be applied to operating margins can vary across industries, and that for software and content licensing, even 50% is reasonable. Since the 25% rule was proposed some years ago, it could be possible that the rule better fits the licensing transactions in traditional industries but needs to be adjusted when applied to the so-called “new economy” industries. As a result, when applying to patent- and IP rights-intensive industries such as software/internet and media, the percentage needs to be adjusted higher.

5. ROYALTY RATE AND PROFIT MARGIN ACROSS INDUSTRIES

If the reported royalty rates do not converge with the rates reached from applying the 25% rule to operating profit margins, the next question is, is there any general linear relationship between royalty rates and profitability? As Goldscheider, et al. (2002), Smith and Parr (2004), and Parr (1999) have pointed out, both direct manufacturing costs and operating expenses should be included in the royalty negotiations. If this is true, assuming the licensing market is efficient, we would expect to see that generally, the higher the profit margins, the higher the associated royalty rates.

To test whether any linear relationship exists between the reported rates and profitability measures, we conduct regression analyses on the reported rates by using profitability measures as explanatory variables. The results are reported in Table 2.

TABLE 2: REGRESSION ANALYSIS:
REPORTED ROYALTY RATES (RRR) AGAINST PROFIT MARGINS

	Intercept	Independent Variables			R^2
		Gross Margin	EBITDA Margin	EBIT Margin	
Dependent Variable: RRR	0.000279	0.1497			0.373
P-value	99.0%	2.0%			
Dependent Variable: RRR	0.0108		0.34658		0.328
P-value	64.5%		3.2%		
Dependent Variable: RRR	0.007318			0.4798	0.324
P-value	76.9%			3.4%	

As shown in Table 2, the regression analyses indicate that there are linear relationships between the reported royalty rates and the profit margins. Precisely, the profit margins explain about one- third to 40% of the variations across 14 industries, and coefficients for each of the profit margins are significant at 2% to 3% level. The results are especially impressive considering the limited samples.

Since the intercepts in all of the regression equations are statistically insignificant, we re-run the regressions by setting the intercept items as zero. The results are reported in Table 3.

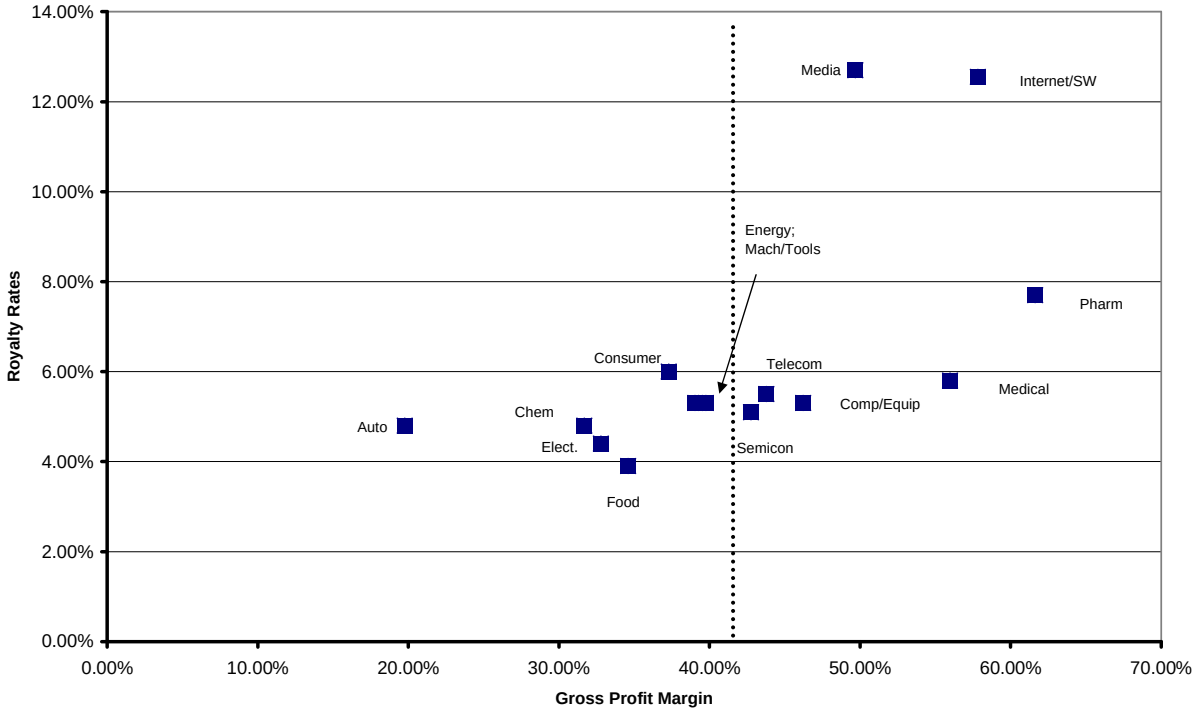
TABLE 3: REGRESSION ANALYSIS WITH INTERCEPT = 0:
REPORTED ROYALTY RATES (RRR) AGAINST PROFIT MARGINS

	Intercept	Independent Variables			R^2
		Gross Margin	EBITDA Margin	EBIT Margin	
Dependent Variable: RRR	0	0.1500			0.373
P-value	NA	0.0%			
Dependent Variable: RRR	0		0.4117		0.315
P-value	NA		0.0%		
Dependent Variable: RRR	0			0.5377	0.319
P-value	NA			0.0%	

Impressively, the zero-intercept regressions have the almost the same explanatory power as indicated by R^2. More importantly, the coefficients in Table 3 may be interpreted as what the 25% rule implies. In other words, on average and at the industry level, the reported royalty rates represent 15%, 41%, and 53% of gross, EBITDA, and EBIT margins, respectively. The coefficient of gross margin, 15%, is especially interesting to us since it offers empirical evidence to a survey result published by Degnan and Horton (1997). In answering a hypothetical question of how much they would like to pay as royalties out of gross profits, the respondents in that survey indicated that they would be willing to pay 10% to 15%.

To further explore the relationship between reported royalty rates and profitability across industries, we plot the pairs in a scatter chart. Since the charts look similar for each of the three profit margins, Chart 2 shows only the gross margin. As demonstrated by Chart 2, the vertical line around 40% of gross margin divides the industries into two groups -- the group to the right enjoying higher gross margins than the one to the left.

CHART 2: 2007 REPORTED ROYALTY RATES AND GROSS PROFIT MARGINS



This pattern reveals two pairs of contrasts between the groups: first, the contrast between high-tech sectors vs. traditional sectors. The right-hand group consists of mainly technology-intensive sectors such as semiconductor and telecom while the one on the left-hand is mainly traditional sectors such as manufacturing and consumer goods. For example, most sectors in the group of higher profit margins are those producing differentiated or specialty goods such as software and medical/health products which are valued more highly in the market. The group to the left includes the businesses that produce commodities such as chemical materials and plastics and mass consumption goods such as food, auto, and consumption goods as well as general goods such as electrical items and tools.

It seems that the two pairs of contrasts in industry profitability are the fundamental factors supporting the linear relationship between the reported royalty rates and the profitability measures. In other words, sectors that are technology-intensive and produce differentiated products generally register high gross margins and hence can afford higher royalty rates. On the other hand, the traditional sectors and the sectors that produce general purpose goods can only obtain modest or low gross margins, and hence result in lower royalty rates.

Based on the analysis above, it seems that the reported royalty rates, although defined as a fixed percentage of sales, may well reflect the structural differences in costs and profitability across industries. In other words, the licensing market is efficient, and differences in the costs and profitability across industries seem to have been factored into royalty rate negotiations.

6. ROYALTY RATES AND OPERATING PROFIT MARGINS: REVISIT THE DATA IN GOLDSCHEIDER, ET AL. (2002)

Goldscheider, et al. (2002) reported that, by matching the reported royalty rates with licensees' operating profit margins, the median royalty rate of 347 companies converge with the royalty rate generated from

applying the 25% rule to the weighted operating profit margin. This is certainly a very impressive result for a company level analysis.

However, matching the reported royalty rates with licensees' operating profit data comes at the expense of data exclusion and information loss. First, a majority of reported royalty rates were excluded. According to Goldscheider, et al. (2002), at the time of their research, RoyaltySource reported 1,533 transactions, but matching the reported royalty rate data with licensees' financials left only 347 companies for study. Also, the reduction in sample size made the sample much less industry-representative. Their research indicated that there were 6,309 companies with data for operating margin calculation. However, after the matching, only the data from 347 companies were used for analysis, leaving five out of the 15 industries with fewer than 10 samples (two of which had fewer than five samples).

Goldcheider, et al. (2002) calculated median royalty rates and operating margins for 15 industries although they did not conduct any further analysis at the industry level. By contrast, we are more interested in the relationship between reported rates and profitability across industries. In this section, we will use the data sets reported by Goldscheider, et al. (2002) to conduct regression analyses similar to what we have done in Section 5.

Goldscheider and his co-authors reported three pairs of royalty rates and operating profit margins for 15 industries[8], including:

i) Industry Data: Include all transaction from the RoyaltySource, and weighted operating profit margins calculated from Bloomberg data. The authors did not use this data set to test the 25% rule, citing that "total industry profits are not a particularly close match to royalty rates covering a limited number of companies."
ii) Licensee Data: The royalty rates and weighted operating profit margins are matched for the set of licensee companies;
iii) Successful Licensee Data: Royalty rates are the same in Licensee Data, while the operating profit margin data is calculated based on only the successful licensees, defined as the licensees "with profit rates in the top quartile for each industries."

We first conduct three sets of regression analyses for each of the data sets above, including all 15 industries. However, the coefficients for the operating profit margins in all of the three equations are negative. This is counter-intuitive and inconsistent with what the 25% rule would imply. Through analyzing the scatter charts, we found that such a counterintuitive pattern was caused by including negative operating profit margins in the analysis. Therefore, we exclude one industry with a negative profit margin from each of the data sets and re-run the regression with only 14 industries. The results are reported in Table 4.

[8] Goldscheider et al (2002) developed their own industry categories that "are somewhat different than the internal classification system used by RoyaltySource", although they used the same industry names as RoyaltySource. Also, they collected financial data from Bloomberg, but did not report how the companies were mapped into the 15 industries.

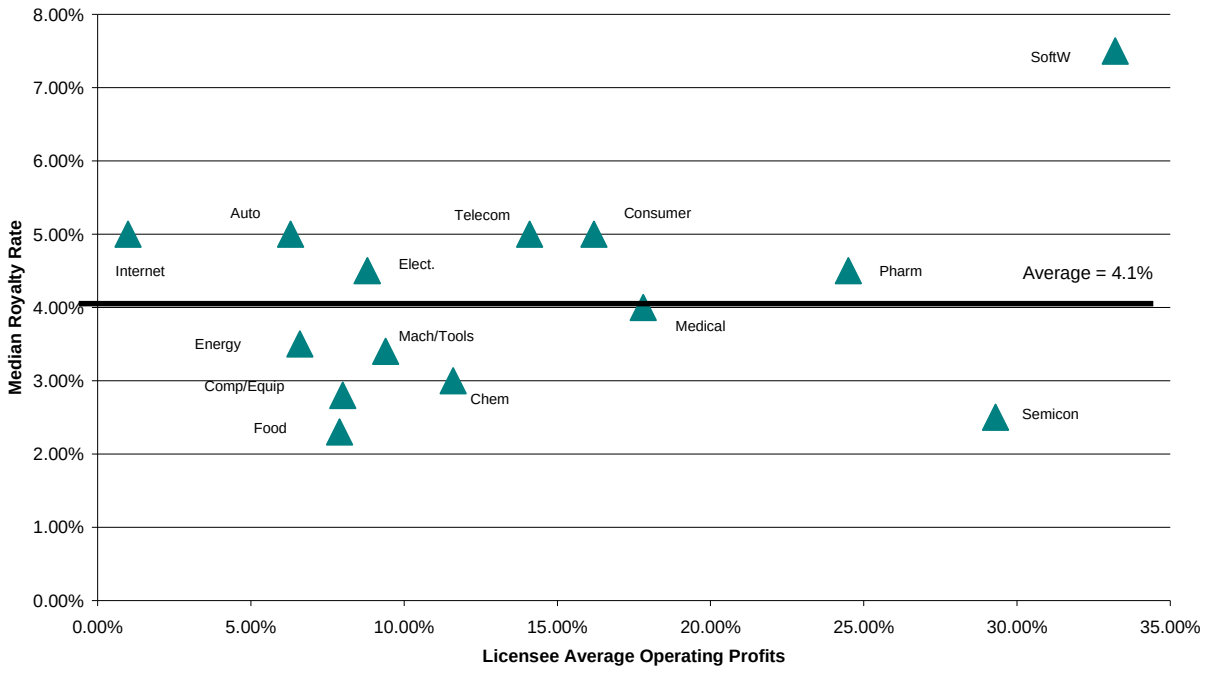
TABLE 4: REGRESSION ANALYSIS:
Based on Goldscheider et al (2002) Data

Dependent Variable and P-value	Intercept	Independent Variables			R^2
		Industry Operating Margin	Licensee Operating Margin	Successful Licensee Operating Margin	
Industry Median Royalty Rate	0.0345	0.1059			0.1079
P-value	0.0%	25.15%			
Licensee Median Royalty Rate	0.034719		0.048247		0.1079
P-value	0.0%		25.2%		
Licensee Median Royalty Rate	0.035336			0.038367	0.0402
P-value	0.0%			49.2%	

As Table 4 shows, operating profit margins are able to explain only 4% to 11% of the variations of the reported royalty rates across industries, and none of the coefficients for operating margins are statistically significant. As a result, using the data in Goldscheider, et al. (2002), we cannot demonstrate that there is general linear relationship between the reported royalty rates and operating profit margins across the 14 industries defined by the authors. This can be vividly seen in Chart 3, where data points scattering around the average royalty rate 4.1%[9].

CHART 3: REPORTED MEDIAN ROYALTY RATES AND AVERAGE OPERATING PROFITS

Based on the Data in Goldscheider et al (2002)



[9] Chart 3 is based on the Licensee Data, excluding Median and Entertainment that was reported to have an operating profit margin of -304.5%. Charts with Industry Data and Successful Licensees Data are similar to Chart 3.

As in Section 5, we then depress the intercept in each of the regression models to zero and re-run the analyses. The results are shown in Table 5.

TABLE 5: REGRESSION ANALYSIS WITH INTERCEPT = 0:
Based on Goldscheider et al (2002) Data

Dependent Variable and P-value	Intercept	Independent Variables			R^2
		Industry Operating Margin	Licensee Operating Margin	Successful Licensee Operating Margin	
Industry Median Royalty Rate	0	0.3706			-0.65
P-value	NA	0.0%			
Licensee Median Royalty Rate	0		0.223821		-1.9231
P-value	NA		0.0%		
Licensee Median Royalty Rate	0			0.225259	-1.096
P-value	NA			0.0%	

A couple of interesting conclusions can be drawn from reading the table. First, the R^2 for each of the regression models is negative, which means a linear model without intercept doesn't fit the data and that there is no linear relationship between the reported rates and operating profit margins. This is simply another way to say that the average of the median royalty rates, or the horizontal line at 4.1% in Chart 3, fits better than the regression equations.

Second, by "forcing" a linear fitting with a zero intercept, regression models based on data set (ii) and (iii) indicate that, across 14 industries as defined by Goldscheider, et al. (2002), the reported royalty rates do represent about 22.5% of the weighted operating profit margins. While this "forced" fitting does offer support to the conclusion reached from analyzing company level data in Goldscheider, et al. (2002) and hence, the 25% rule, the reliability of such a conclusion can be taken with caution.

7. DISCUSSIONS AND CONCLUSIONS

This paper reaches three important conclusions. First, the reported royalty rates across industries do not converge with the rates generated by the 25% rule at industry level, although they generally fall between 25% of gross profit margins and 25% of operating profit margins. Also, EBITDA margin seems to be a more reasonable base upon which to apply the 25% rule compared to gross margin and EBIT margin.

Second, there is a linear relationship between the reported royalty rates and three profitability measures. As shown in Section 5, the reported royalty rates account for 15%, 41%, and 53% of gross, EBITDA, and EBIT margins, respectively. Such a linear relationship suggests that the licensing market is efficient and cost structure and profitability across industries have been factored into royalty rate negotiations. The 25% rule of thumb is simply a special case of such general linear relationship.

Finally, according to our analyses of the data published in Goldscheider, et al. (2002), by imposing a linear fitting between the reported royalty rates and operating margins, the coefficients for the operating margins are about 23%, offering some support to the 25% rule. However, such a conclusion is tempered by the extent and treatment of the data as discussed in Section 6.

There are at least three areas that are worth further research efforts. Our research in this paper covers only 14 industries, a very limited size of sample. Further research may focus on collecting royalty rate and financial data for more industry sectors, which, hopefully, will increase the sample size and make the research more robust and reliable. Also, it will be very interesting to conduct regression analysis using company level data, such as the data sets in Goldscheider, et al. (2002). While matching will inevitably

reduce the sample size and render the sample less industry-representative, studying company level data should reveal additional insights.

Finally, as we mentioned in Section 3.1, our analyses in this paper are based only on the data as published in the December 2007 issue of LER. The RoyaltySource has collected much more licensing transactions than it reports and we use in this paper, but only selectively publishes the data for 15 industries. There are many licensing transactions with royalty payments in either unit running rates, percentages of certain profit measures, or simply lump sum. It is highly possible that by including more industries and by converting non-sales-based royalty payments into sales-based ones, the number of observations can be dramatically increased such that the analysis will be more comprehensive and reliable. Such a research effort shall be able to reveal more than what have known from this paper and lead to more robust and reliable conclusions on the 25% rule.

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