Master Thesis

PATENT CLIFFS AND MERGER RATIONAL

Mergers and Acquisitions in the Pharmaceutical and Biotech Industries

EXECUTIVE SUMMARY

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Abstract

We examine the effects of the acquirer's sales pipeline on the acquisition premiums and on the lagged performance of the merged company in context of pharmaceutical and biotechnology M&A deals between 2000 and 2012. Our database consists of data from Mergermarket, Bloomberg, and EvaluatePharma with detailed information about 102 acquisitions. Using historical sales forecasts, we create *Delta Sales Forecast T3*, a metric that reliably predicts the expected sales performance of a company. We test four proxies proposed by previous literature to replace *Delta Sales Forecast T3*, but we find that none of the proxies is useful. We cannot prove our hypotheses that the acquirer's sales pipeline affects the sales price or the performance of the merged entity, even though are results are often very close to be significant - a notable result given the limited sample size and heterogeneous set of transactions. Finally, we discuss how contract research organizations and personal medicine may help the industry to overcome its productivity issues in the future.

I. EXECUTIVE SUMMARY

Mergers and acquisitions (M&A) in the pharmaceutical industry have been subject to in-depth research in the previous two decades. The majority of this literature concentrates on either how these mergers create value or how they affect research and development (R&D) activities. This Thesis, on the other hand, examines the effects of the acquirer's sales pipeline on the transaction and on the performance of the merged company itself.

Question and Hypotheses Statement

There are three main questions about pharmaceutical M&A transactions that this Thesis seeks to answer:

(1) Are pharmaceutical companies facing pipeline gaps ready to overpay for assets in order to satisfy their shareholders short-term expectations?

(2) Are acquisitions conducted by companies facing pipeline gaps more short-term oriented and thus less effective than acquisitions conducted by companies with robust pipelines?

(3) What future strategies are available for pharmaceutical companies outside of the current approaches to overcome the industry wide productivity challenges?

Based on question (1) and (2), we form the following two hypotheses:

Hypothesis 1: Acquisition premiums are positively correlated with the acquirer's expected decline in future sales.

Hypothesis 2: The effectiveness of an acquisition is negatively correlated with the acquirer's expected decline in future sales.

Question (3) is answered by analyzing the alternative avenues and business models that may help the industry in the future to overcome its productivity challenges.

Data Collection, Sources and Methodology

In order to test our hypotheses, a database of M&A transactions needed to be compiled. Instead of investigating a fully heterogeneous sample of acquisitions, we focus on research and development directed acquisitions in the pharmaceutical and

biotechnology (biotech) industries. The analyzed dataset is made of 102 M&A transactions that took place between 2000 and 2012, with a deal value exceeding $500 Million and with the criterion that the acquired company possessed either marketed drugs or a pharmaceutical pipeline.

The list of transactions is acquired through Mergermarket, a subscription based provider of M&A intelligence. Further information on the ex-post and ex-ante performance and financials of the acquirer and the merged company are gained by combining the Mergermarket transaction list with additional data from a Bloomberg Terminal. Information regarding the acquirer's pipeline, product portfolio and sales forecast is obtained from EvaluatePharma, a subscription based provider of pharmaceutical company related intelligence. The relationships are tested with the statistical program STATA 11.1.

Scope of the Thesis

The aim of this Thesis is to fill the gap in the literature by investigating whether the expected future sales of the acquirer affects the characteristics of the undertaken M&A transaction. We do not investigate why, when or how a company that faces declining sales would undertake an acquisition. We focus on the characteristics of these deals and the performance of the merged companies. We build on the achievements of the previous literature while critically examining some of its results. Finally, we also explore some of the future avenues that may help the industry to overcome its productivity issues.

Overview of the Results

We started with compiling an M&A database using three different sources: Bloomberg, Mergermarket, and EvaluatePharma. Afterwards, we needed to find a metric for the acquirer's expected future sales performance from the time of the acquisition. We established that the historical consensus sales forecasts from EvaluatePharma are ideal sources of this information, and based on them we established *Delta Sales Forecast T3*, which represents the expected development of the acquirer's revenues, prior to the acquisition.

As manually extracting *Delta Sales Forecast T3* from the historical sales forecasts is not only tedious but also only possible to subset of our transactions (because of the limitations of EvaluatePharma) we chose a two-step approach. In the first step, we examined four different proxies proposed by previous literature and tested them against *Delta Sales Forecast T3*. Our test results showed that none of these proxies was able to forecast *Delta Sales Forecast T3* accurately. Therefore, we had to proceed to the actual

hypotheses tests using *Delta Sales Forecast T3* itself. This resulted in a considerably smaller data set due to the unavailability of *Delta Sales Forecast* for every transaction.

After conducting the empirical tests, we acknowledged that none of the two null-hypotheses could be rejected, even though our t-scores were often very close to being significant. This, considering the limited sample size and the heterogeneity of the transactions, is a noteworthy result itself.

In the last part of the Thesis, we introduced the innovation gap, one of the major forces behind the pharmaceutical M&A activity in the past twenty years. We claimed that either the industry has to master its R&D productivity challenges or it has to change its prevailing blockbuster model. We proposed one avenue for both of these scenarios. The R&D productivity issue might be improved with the pooling of resources and best practices, along with the mitigation of risks through common development projects. Contract Research Organizations (CROs), being neutral players in the drug development process, may serve as excellent platforms for these activities, while promoting stronger collaboration among industry players. As far as the sustainability of the current blockbuster model is concerned, we claim that with the current R&D productivity levels the future lies in personalized health care and the development of specialized medicines for smaller patient groups.

Strengths, Limitations and Future Research

The greatest novelty of the Thesis lies in the empirical testing of the future sales proxies suggested by Danzon et al. (2007) against actual historical sales forecasts. We showed that none of these proxies is elaborate enough to forecast reliably the future developments of a pharmaceutical company's sales pipeline.

This result, which is the Thesis' main contribution to the literature, is also the cause of its major limitation, which is the limited sample size of actual hypotheses tests. However, given the unavailability of historical sales forecasts, the sample size could not be extended any further.

It is noteworthy that regardless of our limited sample size and heterogeneous transaction list, multiple test results were close to being significant. We believe that future researchers with more extended databases could repeat similar tests, which might result in significant results, and thus contribute to the literature pharmaceutical mergers and acquisitions.

Conclusion

The pharmaceutical industry is witnessing challenging times. With the current R&D costs and returns, the prevailing blockbuster model does not seem to be sustainable for long. Mergers and acquisitions and other inorganic growth measures may satisfy shareholders and fill pipeline gaps in the short-run, but they cannot solve the fundamental challenges of the industry. Whether these challenges are be solved by new R&D practices or the industry needs fundamentally new business models; future will tell. One thing is clear: this huge, long-profitable industry is reaching the point of inevitable transformation.