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Article

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Pairs trading and market efficiency using an adaptive market hypothesis framework: A pitch

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Abstract: This letter describes my personal experience of articulating a research idea into a standardized research pitch. I have used the pitch to communicate my idea with potential PhD supervisors. Developing a research proposal that covers all necessary aspects is a challenging process. The research pitch facilitates this process by providing a systematic approach towards the issue. I have found the completion of the pitch to be a positive and fruitful experience.

Keywords: Pitching Research; finance; market efficiency; pairs trading

JEL codes: G10, G14

1. Introduction

This letter discusses the process of applying the Faff (2015a) and Faff (2015b) pitch template to a topic in the finance discipline. I am starting my PhD studies in January 2016 and have used the pitch template as a mean to effectively communicate the research topic that I have in mind to my potential supervisors. I believe that one of the most important steps towards starting a PhD degree is the articulation of the research topic. More often than not, this would become a rather complicated challenge for individuals with limited experience. I have found the pitching template to address this issue by systematizing this process. The template helps you remain focused on the areas of the topic which you need to address. It

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also makes you aware of the areas of the topic in which the necessary in-depth knowledge might be lacking. In short, the pitching template organizes your thoughts around all major aspects required for a complete research proposal. This organization is especially vital to novice researchers who might find it difficult to focus on all aspects of a research topic. In addition, the pitching template is a valuable right-to-the-point method of communicating research topics to interested parties such as supervisors who are generally time-poor individuals. It took me around 2 weeks to complete the pitching template, which is a real pitch based on an idea that has been in my mind for a while. This time includes the additional background readings that I found necessary to complete all parts of the template and also communicating with experts in the field and receiving their feedback and comments.

2. The Completion Process

Despite the presence of a flow in the sections of the template in Faff (2015b), my approach to completing the pitch was completely non-linear. The completed research pitch can be found in Table 1. I had thought of the broad topic when I was working in an investment consulting firm. The title of the pitch template is “Pairs trading and market efficiency: An adaptive market hypothesis framework”. As the first step, I worked on the “Basic Research Question” and the “Idea” parts of the pitch simultaneously, as I thought the two were vastly interconnected. My current knowledge and previous thinking of the topic was sufficient to complete a first draft of these parts. As a result of this step, the motivation and puzzle behind this research topic came to the center of my attention. Although I had a vague understanding of the puzzle involved, I realized that additional reading of the relevant literature is required before I am able to clearly and formally demonstrate it.

The two key questions, “What’s new?” and “So What?”, were the next parts that evolved in the process. This section of the pitching template is of vital importance, as it is where the worthiness of the research topic can be showcased, and consequently, it was also one of the most time-consuming parts of the template. Faff’s Mickey Mouse concept helped with identifying the novelty of the research idea clearly and precisely, as shown in Figure 1. This part is also closely related to the parts that I had done earlier. As I worked out the novelty and the importance of the research topic, I became aware of the potential improvements that I can make on the idea, and consequently, the research question was also fine-tuned during this phase. It was only after the completion of this section that I had a clear understanding of what my three key papers were.



Figure 1. Mickey Mouse diagram characterizing novelty of research idea

The contribution section, which can be named as the single most important aspect of any research topic, was a natural outcome of the previous section. However, a detailed understanding of the gaps in the current literature was needed before the contributions could be set out formally. The contributions were then inspected carefully, and any contribution that was not important enough or did not point to a gap in the literature resulted in a review of the previous sections especially the “idea” and “research question” in order to make all contributions relevant and important. So, it is clear that despite sections being completed one by one, the whole process is an iterative one and many of the sections would be revised again and again before being complete.

Next, I had a closer look at the “Data” and “Tools” required for the research topic that I am proposing. Although I had an idea of both before starting the pitch template, the effort to actually put them on paper highlighted the necessity of a detailed study on the required data and tools and the issues that might be faced in that regards, with the hope of reducing surprises later in the research process. As my personal experience, I found it very easy to overlook relatively serious issues that might even pose as threats to the whole project, if one does not think about the data and tools in some detail before starting the research. In my case, I became aware of the difficulty obtaining some intraday data that was necessary for my initial research question, and therefore modified the research question accordingly.

The “Other Considerations” section is something that I found very appealing. It focuses on addressing issues that might not come straight into the mind of a researcher, especially one like me who is at the beginning of his career. However, the template offers some valuable points to help trigger thinking about these potential issues. Some of these issues might even be a deal breaker, and therefore, it is imperative to address them beforehand. For example, if a research project

needs collaboration between parties that are not accessible to the researcher, it is best if the project is not perused. This saves resources and even mental frustration of the researcher later down the line when he realizes that the project cannot be completed.

3. Personal reflection

As a person who is at the beginning of his career in research, I find developing a research idea into well-defined research proposal quite challenging. There are lots of different aspects to cover which seems like a difficult task, if not impossible, to stay organized. For me, the pitch template was just the right tool to overcome such difficulty. It helped me to stay disciplined and focused throughout the process. Having a template to work on, I was confident that I will not miss some vital points.

The pitch template has also influenced my approach towards reading other research. As I read through research papers, I try to split the research into section headings from the research pitch template. This would allow me to quickly categorize the paper, for example based on their contribution, methodology, and etc., and prioritize my readings accordingly.

4. Conclusion

This letter outlines the experience I had completing a research pitch template in the finance discipline. The main benefit that the pitching template had for me was the discipline that it brought with itself to the process of developing a research idea into a research proposal. Giving enough attention to every aspect of a research proposal is easier said than done, especially for an inexperienced researcher, and the standardized framework of the pitch template tackles this issue directly.

The audiences of a research proposal are usually time-poor individuals such as supervisors and fellow academics. The short 2-page research pitch would therefore allow an effective communication of the major aspects of the research topic to these individuals in a short time, which will ultimately benefit the pitcher.

I, personally, had a positive experience using the pitch template for an idea that I would like to pursue as my PhD topic. I found my thoughts to be more organized when attempting to complete specific sections of the template compared to when writing traditional research proposal. The short nature of the template helped me direct my focus on the core aspects of the idea and their development.

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Table 1. Completed 2-page pitch template on pairs trading

Pitcher's Name	Hossein Rad	FoR category: Financial markets	Date Completed: 09/09/2015
(A) Working Title	Pairs trading and market efficiency: An adaptive market hypothesis framework.		
(B) Basic Research Question	<ol style="list-style-type: none"> 1. What is the relationship between pairs trading profitability and market efficiency? 2. Does pairs trading has a diversification effect on portfolios? 		
(C) Key paper(s)	Binh Do and Robert Faff, "Does Simple Pairs Trading Still Work?" <i>Financial Analysts Journal</i> , Vol. 66, No. 4 (July/August 2010), pp. 83-95 Lo, Andrew W., "Adaptive Markets and the New World Order (corrected May 2012)." <i>Financial Analysts Journal</i> 68.2 (2012): 18–29. Lo, Andrew W., "The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective", <i>Journal of Portfolio Management</i> 30(2004), 15–29.		
(D) Motivation/ Puzzle	<ol style="list-style-type: none"> 1. Do and Faff (2010) show that the profitability of pairs trading is declining, using the simple distance approach for pair selection. They also argue that this decline is caused by the increase in arbitrage risk rather than the efficiency of the market. However, an alternative explanation can be that such simple strategies fail to capture the true price relationship between pairs and therefore the permanent divergences (named fundamental risk in Do and Faff (2010)) are in fact the effect of increased market efficiency and a response to the divergence in the fundamentals of the pair. Also, the increased competition (e.g. hedge funds) might be focusing on the true arbitrage opportunities, rather than seeing simple divergence from an equilibrium defined by distance approach as an opportunity, and in fact increasing the market efficiency. 2. Do and Faff (2010) show that pairs trading is more profitable during turbulent market conditions. If the increase in profitability during these times can be explained using an AMH framework and if during these times including pairs in a portfolio of different asset classes such as equity, fixed income, etc. would increase the diversification of the portfolio, including long-short pairs in a portfolio could be an alternative investment strategy during financial crises. 		
THREE	Three core aspects of any empirical research project i.e. the "IDIoTs" guide		
(E) Idea?	The core idea is to study the sources of pairs trading profitability. The central hypothesis would be: pairs trading profitability decrease with the increase in market efficiency and vice versa. First, we will implement three different pairs trading strategy to examine the profitability of strategies with different complexities: <ol style="list-style-type: none"> 1. Pairs selection using simple distance approach. 2. Pairs selection using cointegration. 3. Pairs selection using copula. Next, we introduce an Adaptive Market Hypothesis (AMH) framework, which allows the evolution of market efficiency in comparison to a static approach, to examine the degree of market efficiency evolved over time. The same framework can be set to examine the efficiency of pairs' industry sectors and individual stock prices. In the next step, we define and calculate various risks associated with pairs trading: liquidity risk, long-term divergence risk (noise trading and fundamental risks), and synchronization risk. Then, we test the effect market efficiency and the risks on profitability of the strategies.		
(F) Data?	The theoretical tension between EMH and behavioural finance can be addressed using AMH, which employs both theories. Initially, due to availability, we will start with US data and in the next stage the data can be extended to include other countries. In order to be able to compare, daily time-series is used. Market, Industry, and firm specific market data are needed. As it is standard market data, the data is available commercially and is of high quality. No hand-collecting and research assistance is required. Maybe just minor filtering of data related to the purpose of each part of research would be needed.		
(G) Tools?	The research is a regression model approach. Empirical analysis of theoretical models of cointegration and fractional		

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Pitcher's Name	Hossein Rad	FoR category: Financial markets	Date Completed: 09/09/2015
	<p>cointegration are also used extensively. The framework of such analysis is available in literature. Mainstream mathematical and statistical software such as Matlab and Stata is used for strategy implementation and data analysis.</p> <p>Having a bachelor degree in computer science and working as a programmer I have no problem with the technical side of implementing strategies. Statistical and econometric tests and validity are extractable from relevant literature combined with collaboration with experts.</p>		
TWO	Two key questions		
(H) What's New?	<p>The novelty in this idea is to study the effect of market efficiency on the profitability of pairs trading strategy in an Adaptive Market Hypothesis framework which has never been done before. This would allow comparing the profitability of different pairs trading approaches with one another and, more importantly, studying how their profitability is influenced by periods of increasing and decreasing market efficiency. This study would explore the possibility that pairs trading strategies would be profitable in some market condition and not in others and these cycles can repeat from time to time.</p>		
(I) So What?	<p>If pairs trading profitability can be explained in an AMH framework, this framework can be used to further advance dynamic asset allocation and dynamic portfolio management literature. Especially if we can also find evidence of increased diversification in such strategies. It can become a tool in portfolio management and help switching between strategies or including pairs in the portfolio based on market conditions and, when extended, other parameters such as macro economic parameters.</p>		
ONE	One bottom line		
(J) Contribution?	<p>The contribution is the introduction of AMH framework implementation to simple practical and empirical questions that may have seemed contradictory before AMH, which is the co-existence of statistical arbitrage and market efficiency. Also, introducing long-short pairs as an alternative asset class to include in portfolios in certain times to increase diversification and meet certain portfolio risk constraints.</p>		
(K) Other Considerations	<p>Collaboration is desired with the aim to improve and further narrow the idea. No collaboration is needed for data or tools. Target journals are journals on the same tier as key papers' journal tiers with an emphasis on empirical research. No result risk: low. As either rejecting or confirming the hypothesis has valuable contributions. Competitor risk: low. As AMH framework is relatively new and little empirical research has been done in this field, the odds of multiple researchers choosing the same research question is relatively low. Obsolescence risk: low. After recent financial crisis there has been an increased interest in alternative investment strategies and especially market neutral strategies that can withstand unstable markets and uncertainty. Challenges: the fine-tuning of the central hypothesis might be a bit challenging which I propose to address with further collaboration.</p>		