CHAPTER 1

Introduction

This thesis is composed by three articles in the area of empirical asset pricing. The first chapter explores the effects of short-sales constraints on the stock price behavior. The second chapter focuses on estimating the risk and risk-adjusted return of private equity funds. The last chapter investigates whether stock price movements are temporarily different around so-called price barriers. Although the topics of the different chapters are not directly connected, the empirical strategy in each article is centered around estimating the market beta. For the short-sales constraints, the lagged market beta is used as a barometer to evaluate the price delays of the stocks due to the policy on short-sales constraints. For private equity funds, the beta is estimated by a new GMM-style methodology. In the last chapter, we use the change in the contemporaneous beta to detect the existence of price barriers. In general, this thesis contributes to the understanding of the comovement between assets and the market and also to its potential application as a statistical tool.

Chapter 2 ("Dynamic Short-Sales Constraints, Price Limits and Price Delays") discusses a hot-debated issue during each financial crisis. It is a common response of regulators to impose some form of short-sales constraints when facing stock market downturns. Although widely adopted by regulators, the academic research has not reached a conclusion about its impact on stock prices. Miller (1977) argues that if short-sales constraints are imposed, stock prices are set only by optimistic investors and these stocks are thus overpriced. With a rational expectation model, however, Diamond and Verrecchia (1987) argue that short-sales constraints do not necessarily bias prices upward. Investors rationally incorporate the constraints into prices. Bai, Chang and Wang (2006) argue that risk-averse investors, instead of risk-neutrality world in Diamond and Verrecchia (1987), will ask a higher premium as compensation for bearing more risk due to less informative trades. In
this chapter, we shed light on the theories by providing a unique empirical strategy to study the effect of short-sales constraints on the prices.

We take advantage of a natural experiment in the Taiwan stock market. This experiment creates daily dynamics of short-sales constraints. The constraints are imposed by the regulators rather than determined by the supply and demand of the lending market. This specific feature alleviates the concern of endogeneity or reverse causality. The tightness of the constraints is not related to firm-specific characteristics like size or liquidity, which might also affect the lending market equilibrium. In addition, for rational expectation to work, the constraints should public information for the investors to incorporate them into the prices. In contrast to the lending market data, our short-sales constraints are observed by all investors and thus provide an ideal environment to test the theories mentioned above. The main contribution of the chapter is thus to evaluate the influence of short-sales constraints on stock price delays in an endogeneity-free setup.

Chapter 3 ("A New Method to Estimate Risk and Return of Non-traded Assets from Cash Flows: The Case of Private Equity Funds") proposes a new way to estimate the risk and return of a non-traded asset for which we only observe cash flows.\(^1\) We apply our new methodology to a trillion-dollar asset class: private equity funds. These funds are financial intermediaries that are typically classified as venture capital focused or buyout focused. They are not publicly traded and investors observe only a stream of cash flows for about 10 years. There are several unique features of the industry compared with the equity and bond market. For example, private equity fund investors give away cash at different points in time and receive dividends at other points in time during fund’s finite life. In addition, for leveraged buyouts one often observes multiple cash flows, making it impossible to calculate the buyout return directly. Therefore, the standard estimation techniques for the risk and return cannot be readily applied. In this chapter, we contribute to the literature by proposing a methodology in such a context that overcomes the difficulties.

The intuition for the method is simple. The expected net present value of the cash flows of a liquidated fund should be zero, where the discounting is done using

\(^1\)Co-authored with Joost Driessen and Ludovic Phalippou.
a chosen asset pricing model. This gives a moment restriction. By grouping funds into portfolios, we can derive the sample equivalent of the moment conditions. The system is overidentified if we have a sufficient number of portfolios and consistency is obtained as the number of funds in a portfolio increases. The parameter estimates of the asset pricing model are those that bring all the NPVs as close to zero as possible. Overall, our method shows that observing the time series of market values is not necessary to consistently estimate risk and return. Neither are distributional assumptions on returns.

Chapter 4 ("Detecting Price Barriers") explores a popular but less studied industry practice, the charting or technical analysis. Survey data shows a high percentage of traders relying on some form of technical analysis. Major media also provide on-line sophisticated charting tools for retail investors. However, trading rules based on technical analysis can be very subjective and ad hoc. The numerous rules also raise concerns of data-snooping if any useful pattern is found. This might be why the academia usually has a skeptical view on technical analysis, and sometimes compares it to alchemy or astrology. In this chapter, we study two of the most popular technical trading rules, involving so-called resistance and support price barriers. We provide a new perspective to study whether the alleged barriers exist in individual stock prices, and also investigate the effects on the price movements.

Specifically, we focus on the change in the second moments when stock prices are around the barriers. If the price temporarily deviates from its fundamental value around the defined barriers, this could imply a short-term comovement breakdown between its returns and the market returns. Hence, the change of the market beta can serve as a detector. We also offer a complete picture of the price behaviors around the barriers. Most studies only focus on the return predictability or trading profits after market indices breaking through the barriers. Intuitively, the effect of price barriers should not be limited on index dynamics after the breakthrough. In addition, we report the risk-adjusted returns by controlling for known risk factors like size, book-to-market price ratio and momentum. In sum, this chapter contributes to the literature on technical analysis and psychological price barriers, and

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2Co-authored with Joost Driessen and Otto van Hemert.
can also be seen as adding to the studies that use a statistical approach to detect market psychology.