



Chapter 1

General Introduction

Asset pricing theory shares the positive versus normative tension present in the rest of economics. Does it describe the way the world does work or the way the world should work?

Cochrane (2009, p. xiii)

© Der/die Autor(en) 2021

B. C. Müller, *Three Essays on Empirical Asset Pricing in International Equity Markets*, Gabler Theses,

https://doi.org/10.1007/978-3-658-35479-4_1

1.1 Motivation and Background

Within the field of capital market research, two diametrically opposed conceptions continue to be prevailing: The efficient market hypothesis by [Fama \(1970\)](#) on the one hand and the behavioral finance approach by [Shiller \(2003\)](#) on the other hand. According to [Fama \(1970\)](#), capital markets are efficient in a sense that current prices of securities incorporate all information available up to that point in time. Consequently, following Fama's reasoning, there exist no possibilities to gain riskless profits by exploiting mispricings (so-called arbitrage) ([Fama, 1970](#)). [Shiller \(2003\)](#), in contrast, puts forward the claim that markets tend to behave irrationally, implying that there indeed exist possibilities to exploit mispricings. Those fundamentally different views on the functioning of financial markets as well as concomitant therewith their wide discrepancy, has been highlighted by the fact that both economists have been awarded the Nobel Prize in Economic Sciences in 2013. In 2017, another supporter and co-founder of the behavioral economics approach, Richard Thaler, has been awarded the Nobel Prize in Economic Sciences – emphasizing once more the relevance and topicality of this debate ([The Nobel Foundation, 2021](#)).

Central to this ongoing controversy is the existence of return anomalies. Return anomalies are empirical return patterns that cannot be comprehensively explained by existing asset pricing models ([Avramov and Chordia, 2006](#); [Brennan and Xia, 2001](#); [Fama and French, 1996](#)). These models range from the traditional capital asset pricing model (CAPM) by [Sharpe \(1964\)](#) and [Lintner \(1965, 1969\)](#), to the three and five factor models by [Fama and French \(1993, 2015\)](#), the four factor model by [Carhart \(1997\)](#), to the more recent q-factors approach by [Hou et al. \(2015, 2020b\)](#), the four factor model by [Stambaugh and Yuan \(2017\)](#), and the behavioral model by [Daniel et al. \(2020\)](#). This range of existing asset pricing models is broad despite being non-exhaustive and continues to grow as a vast amount of new asset pricing factors and anomalies has inundated top finance journals throughout the past decades ([Cochrane, 2011](#); [Harvey et al., 2016](#); [Harvey, 2017](#)).

Current research still struggles to justify whether or not the existence of return anomalies can be in line with Fama's efficient market hypothesis. [Fama \(2014\)](#) for instance argues that tests of market efficiency are invariably joint tests of efficiency and the respective asset

pricing model used, thus advocating the assumption that anomalies could be explained by the inadequacy of the underlying asset pricing model applied. On the other hand, [Shiller \(2003\)](#) and [Thaler \(2005\)](#) for instance hold the opinion that irrational investor behavior pushes security prices away from fundamental values, as the existence of bubbles and crises within financial markets might indicate likewise.

This positive versus normative tension is illustrated by the introductory quote by [Cochrane \(2009\)](#) cited at the beginning of this chapter: Either existing asset pricing models need improvement or the world is wrong and financial assets are at least partially mispriced. Given the vast amount of newly discovered asset pricing factors and anomalies, this discussion has been augmented by a third dimension which emphasizes severe data mining concerns, implying that many of those recently reported asset pricing factors and anomalies might simply be false and rather driven by the so-called publication bias ([Cochrane, 2011](#); [Harvey et al., 2016](#); [Harvey, 2017](#)).

This dissertation contributes to this debate by studying asset pricing anomalies, factors, as well as investor behavior across international equity markets.

1.2 International Equity Markets: An Overview

Within this thesis, international equity markets are considered to be all national equity markets with the exception of the U.S. market. To interact international markets with the U.S., Table 1.1 provides an overview of the ten largest equity markets globally by 2018. Calculations are based upon World Bank data.¹ Markets are ranked in terms of market capitalization of listed domestic companies to aggregate global market capitalization.

Table 1.1: Largest Equity Markets Across the Globe

This table provides an overview of the ten largest stock markets globally as measured by the percental market capitalization of listed domestic companies to worldwide stock market capitalization (Market Cap in % of World) by 2018. Additionally, the table shows the percentage of local GDP to entire world GDP as well as the local market capitalization in percent of local GDP. National currencies are converted to U.S. Dollars.

Country	Market Cap in % of World	Local GDP in % of World	Market Cap in % of Local GDP
United States	43.48%	24.42%	147.89%
China	9.13%	16.28%	45.52%
Japan	7.68%	5.81%	106.90%
Hong Kong	5.51%	0.42%	1055.92%
France	3.48%	3.26%	84.87%
India	3.04%	3.14%	76.79%
Canada	2.75%	1.98%	112.91%
Germany	2.61%	4.65%	44.28%
South Korea	2.03%	1.98%	81.96%
Switzerland	2.03%	0.83%	204.38%

As illustrated within Table 1.1, the U.S. market accounted for approximately 43.48% of global stock market capitalization by 2018, being followed by China (9.13%), and Japan (7.68%). Simultaneously, the U.S. economy represented 24.42% of global GDP, whereas China accounted for 16.28% and Japan for 5.81% of global GDP. Despite their leading role in terms of global percental market capitalization, the U.S. market capitalization constituted only 147.89% of local GDP, whereas this number for instance equalled 1055.92% for Hong

¹Corresponding data is accessible online at <https://data.worldbank.org/>.

Kong or 204.38% for Switzerland.

These figures exemplify that the U.S. market is still by far the largest equity market in the world. On the other hand, however, the numbers strikingly illustrate that according to World Bank data, almost 60% of the entire stock market capitalization and nearly 75% of global GDP is attributable to international markets. Beyond their importance in terms of economic figures, studying international markets is a worthwhile endeavor for at least the following reasons:

- To test the validity, persistence, and robustness of asset pricing factors and anomalies (Fama and French, 2012, 2017; Jacobs and Müller, 2020)
- To understand what segments and integrates global equity markets (Bekaert et al., 2011; Bekaert and Harvey, 2017; Carrieri et al., 2013)
- To improve regulatory frameworks and market conditions (Albuquerque and Wang, 2008; Hail and Leuz, 2006; Portes and Rey, 2005)
- To identify cross-country differences in investor behavior and their underlying causes (Beugelsdijk and Frijns, 2010; Grinblatt and Keloharju, 2001; Laudenbach et al., 2020)
- To exploit and improve investment strategies (Jacobs and Müller, 2018, 2020; Rizova, 2010)

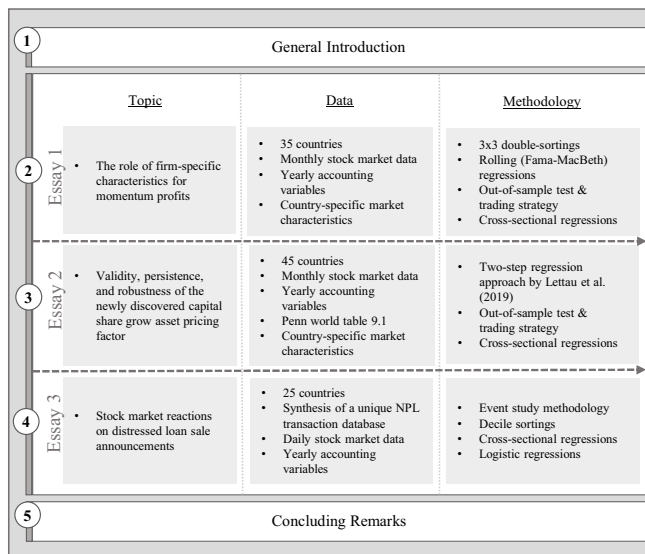
Despite this economic and scientific importance, the bulk of academic studies up to date still centers on the U.S. market (Karolyi, 2016; Jacobs and Müller, 2020). In fact, Karolyi (2016) finds that only 23% of all empirical studies published in top finance journals focus on non-U.S. markets. This dissertation provides a contribution to this research gap by focusing on empirical asset pricing across international stock markets. The subsequent section provides an overview of the studies comprised within the thesis, summarizes corresponding research questions, underlying data sets used, methodologies applied as well as corresponding main findings.

1.3 Dissertation Studies and Research Questions

This thesis presents three essays on empirical asset pricing in international equity markets. Each essay is a stand-alone empirical study examining the topic from a different angle. The central aspect these essays have in common is that they entirely focus on empirical asset pricing in international equity markets. Figure 1.1 provides an overview of the structure of the thesis and briefly summarizes the topic, data sets, and methodologies of each dissertation study.

Figure 1.1: Overview of Thesis Structure

This figure provides an overview of the main structure of the thesis. Additionally, for each of the three empirical essays, the graph summarizes and contrasts the topic investigated, corresponding data sets used as well as methodologies applied.



1.3.1 Essay 1: Cross-Country Composite Momentum

The *first essay*² (Chapter 2) provides a comprehensive analysis on how firm-specific characteristics relate to the momentum effect. Momentum illustrates the tendency of recent past winner stocks to outperform recent past loser stocks over three to twelve months holding periods (Jegadeesh and Titman, 1993). Researchers have hitherto not reached a consensus on whether this effect can be in line with the efficient market hypothesis by Fama (1970) or whether causes of momentum should be ascribed to irrational investor behavior (Daniel et al., 1998; Hong and Stein, 1999; Li, 2018; Vayanos and Woolley, 2013). More recently, several academic studies have started to analyze the role of stock characteristics for momentum to exist (Da et al., 2014; Hillert et al., 2014; Sagi and Seasholes, 2007; Zhang, 2006). The rationale beyond is that certain attributes may indicate if a stock is prone to behavioral biases or that certain characteristics may signal specific risk features. As a result, a substantial amount of complex interaction patterns has emerged, with the underlying causes inconsistently subsumed by prior research. Given this fragmentation and disparity, the research questions addressed within the first dissertation study are as follows:

1. Do stock characteristics have true power in enhancing and thus explaining momentum returns?
2. Which characteristics are the most consistent drivers of momentum?
3. Are there differences or commonalities across countries and regions worldwide?
4. What explains potential geographic heterogeneity?

The study implements a 35 country-level analysis of 18 stock characteristics between January 1989 and June 2019 to answer these research questions. The results show that momentum profits can be predicted and enhanced across many international markets when combining information of these stock characteristics. Predicted momentum profits can yield significant positive out-of-sample portfolio returns which cannot be explained by idiosyncratic volatility, extreme past returns or Carhart's four factors to their full extent. Applying cross-sectional

²This chapter is based on the following working paper: Müller, B. and Müller, S. (2020). Cross-Country Composite Momentum. Available online at SSRN.

regression analyses, the study identifies that both, ordinary and characteristics-enhanced momentum returns originate from behavioral biases. Specifically, the study shows that global differences can best be explained by cultural differences as proxied by the six cultural dimensions of Hofstede (2011).

1.3.2 Essay 2: Capital Share Risk in International Asset Pricing

The *second essay*³ (Chapter 3) examines the validity, persistence, and robustness of a newly discovered asset pricing factor. Specifically, the study analyzes whether growth in the capital share (KS) of aggregate income (GDP) is a priced risk factor across international equity markets as proposed by Lettau et al. (2019) for the U.S. market. Within their paper, Lettau et al. (2019) exemplify that this single factor outperforms, and even subsumes, information in prominent and well-established asset pricing models. Therefore, the second dissertation study strives to answer the following research questions:

1. Is capital share growth a persistent and consistent driver of equity portfolio returns across global equity markets?
2. Are there differences and commonalities across countries and regions worldwide? What explains potential cross-country differences?
3. Is it possible to exploit the information contained in the capital share growth factor by a tradable (out-of-sample) investment strategy?

The analysis concentrates on 45 equity markets between January 1989 and December 2017. Following the two-step regression approach by Lettau et al. (2019), the empirical evidence demonstrates that capital share growth is a priced risk factor across international markets which, however, exhibits strong geographic heterogeneity. Pooled estimates show that capital share growth is particularly significant for Emerging Markets, while being less relevant for G7 + Australia (excl. U.S. market). Unlike the U.S., the information contained in the

³This chapter is based on the following working paper: Müller, B., Müller, S., and Schiereck, D. (2021). Capital Share Risk in International Asset Pricing. Available online at SSRN.

KS factor of international markets does not subsume information contained in alternative factor models, but partly adds additional explanatory content to these model specifications. Furthermore, the analysis identifies that capital share growth is a local rather than global asset pricing factor given that the explanatory power is substantially reduced once applying global rather than local risk estimates. Country differences are found to originate from variations in private wealth inequality as well as differences in public wealth and public reserves. Lastly, the study illustrates that the information contained in the capital share growth factor cannot be exploited by an out-of-sample investment strategy despite strong in-sample explanatory power.

1.3.3 Essay 3: The Pricing of European Non-Performing Real Estate Loan Portfolios

The *third essay*⁴ (Chapter 4) studies how European equity markets react upon distressed loan sale announcements. Distressed loans, also referred to as non-performing loans (NPL), are risky and complex bank assets that to a large extent tend to be collateralized by real estate (Fell et al., 2017). Several recent academic studies, however, have detected severe problems of financial market participants in the pricing of real estate financial products (Cici et al., 2011; Mori and Ziobrowski, 2011; Woltering et al., 2018). The third study contributes to this literature stream by addressing the following research questions:

1. How do capital market participants evaluate complex asset sales whose cash flows are heavily dependent on real estate income?
2. To what extent can potentially abnormal returns be explained upon the basis of vendor characteristics?
3. Which institutions take the risk involved in those sold portfolios?

To answer these questions, a unique data set for distressed loan sales from European vendor banks is synthesized from 2012 to 2018. This data set is applied to provide summary

⁴This chapter is based on the following publication: Manz, F., Müller, B., and Schiereck, D. (2020). The pricing of European non-performing real estate loan portfolios: Evidence on stock market evaluation of complex asset sales. *Journal of Business Economics*, 90:1087-1120.

statistics on the European NPL market, which thus far lacks transparency and publicly available information. Next, provided that corresponding banks are publicly traded, event study methodology is used to examine short-term valuation effects following NPL sale announcements. The results provide robust evidence in favor of a significant positive stock market reaction at vendor banks following NPL sales. Cross-sectional regression analysis reveals that positive market reactions are driven by a size effect and real estate collateral. Lastly, using logistic regression analysis, the study shows that real estate NPLs are most often acquired by opportunistic funds, while they are avoided by consortia of multiple buyers and undisclosed investors. The study attributes these findings to the specific characteristics of real estate as an asset class and the specific knowledge and human resources needed by investors to cope with it.

Subsequently, the three dissertation studies are presented in detail. The final chapter (Chapter 5) provides a summary of the thesis' main findings and delivers a final conclusion.

