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Journal of Banking & Finance 30 (2006) 2347–2369

Journal of BANKING & FINANCE

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Portfolio implications of systemic crises ☆

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Received 26 May 2005; accepted 30 August 2005
Available online 9 December 2005

Abstract

Systemic crises can have grave consequences for investors in international equity markets, because they cause the risk-return trade-off to deteriorate severely for a longer period. We propose a novel approach to include the possibility of systemic crises in asset allocation decisions. By combining regime switching models with Merton [Merton, R.C., 1969. Lifetime portfolio selection under uncertainty: The continuous time case. Review of Economics and Statistics 51, 247–257]-style portfolio construction, our approach captures persistence of crises much better than existing models. Our analysis shows that incorporating systemic crises greatly affects asset allocation decisions, while the costs of ignoring them is substantial. For an expected utility maximizing US investor, who can invest globally these costs range from 1.13% per year of his initial wealth when he has no prior information on the likelihood of a crisis, to over 3% per month if a crisis occurs with almost certainty. If a crisis is taken into account, the investor allocates less to risky assets, and particularly less to the crisis prone emerging markets.
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JEL classification: G11; G15; F30; C51

Keywords: Asset allocation; Systemic risk; International finance; Regime switching models

☆ The authors thank Hans Dewachter, Robert Engle, Nadja Guenster, Ben Jacobsen, Til Schuermann, Raman Uppal, Mathijs van Dijk, and seminar participants at the EFA 2005 Meetings in Moscow, the JAE conference on Changing Structures in International and Financial Markets in Venice, the NAKE research day 2004, Tilburg University, Maastricht University and Erasmus University Rotterdam for valuable comments.

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doi:10.1016/j.jbankfin.2005.08.006

1. Introduction

Systemic crises can wreak havoc on financial systems, making these crises an important issue for study. De Bandt and Hartmann (2000) and Dow (2000) provide excellent surveys on the characteristics and causes of systemic crises for the different financial markets. In this article we focus on the consequences of systemic crises for investors in international equity markets. International investors suffer from the deterioration of the risk and return characteristics, as systemic crises exhibit a sharp drop in returns, an upswing in volatilities and a rise of the correlations between financial markets, all on a global scale. Evidence of this behavior has been based on the October 1987 stock market crash, and the crises that originated from the emerging markets in the 1990s (e.g. the Mexican crisis of 1994, the Asian crisis of 1997 and the Russian crisis of 1998).[2] Due to their irregular and rare occurrence, standard models that investors use to support their asset allocation decisions typically fail to account for systemic crises, resulting in suboptimal allocations.

Das and Uppal (2004) conclude that the portfolio implications of systemic crises are limited. However, their approach implies that a systemic crises is a short-lived event that is hardly persistent, which is in contrast with recent crises and their aftermaths that lasted several months. If the risk-return trade-off deteriorates for a longer period, the impact of systemic crises will be more severe. To include possible persistence, we investigate their impact by means of a regime switching model in the style of Ang and Bekaert (2002), which we combine with optimal portfolio construction as set out by Merton (1969, 1971). This approach allows us to model the behavior of asset returns on a regime by regime basis, making it both simple and flexible. Formulating and solving the asset allocation problem in continuous time ensures analytical tractability.

We distinguish among two strategies that a utility-maximizing investor can adopt to solve his asset allocation problem: a crisis conscious and a crisis ignorant strategy. The crisis conscious strategy includes a systemic crises as a distinct regime in which all markets encounter a shock, while the crisis ignorant strategy does not. For both strategies, we construct optimal portfolios. By comparing the portfolios we assess the implications and importance of a systemic crisis. For a US-based global investor, who can invest in stock markets in the US, Europe, Japan, Hong Kong, Thailand, Korea and Brazil, and a riskless asset, we find that the crisis conscious strategy leads to a reduction of the investments in risky assets and a shift to countries less prone to a crisis. A small probability of a crisis (of say 5%) already causes these adjustments, and they quickly become more pronounced if the probability increases. Ignoring a crisis is costly, as the investor requires a certainty equivalent return of 1.13% per year as a compensation if he has no information on the ex-ante probability of a crisis. If the investor knows with almost certainty that a crisis occurs, this compensation can easily exceed 3% per month.

This paper extends the analysis of Das and Uppal (2004) in three important aspects. First, our model is better able to capture the persistence of a crisis, because we include a systemic crisis as a distinct regime in a regime switching model, while they incorporate

[2] Roll (1988, 1989), Bertero and Mayer (1990) and King and Wadhwani (1990) studied the October 1987 crash, Calvo and Reinhart (1996) the Mexican crisis, Kaminsky and Schmukler (1999) and Baig and Goldfajn (1999) the Asian crisis, and Kaminsky and Reinhart (2002) the Asian and Russian crises.

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