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International stock return predictability: Evidence from new statistical tests[☆]Amélie Charles^a, Olivier Darné^{b,1}, Jae H. Kim^{c,*}^aAudencia Business School, 8 route de la Joneliere, 44312 Nantes, France^bLEMNA, University of Nantes, IEMN-IAE, Chemin de la Censive du Tertre, BP 52231, 44322 Nantes, France^cDepartment of Economics and Finance, La Trobe University, Australia

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ABSTRACT

We investigate whether stock returns of international markets are predictable from a range of fundamentals including key financial ratios (dividend-price ratio, dividend-yield, earnings-price ratio, dividend-payout ratio), technical indicators (price pressure, change in volume), and short-term interest rates. We adopt two new alternative testing and estimation methods: the improved augmented regression method and wild bootstrapping of predictive model based on a restricted VAR form. Both methods take explicit account of endogeneity of predictors, providing bias-reduced estimation and improved statistical inference in small samples. From monthly data of 16 Asia-Pacific (including U.S.) and 21 European stock markets from 2000 to 2014, we find that the financial ratios show weak predictive ability with small effect sizes and poor out-of-sample forecasting performances. In contrast, the price pressure and interest rate are found to be strong predictors for stock return with large effect sizes and satisfactory out-of-sample forecasting performance.

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1. Introduction

Whether stock return is predictable from an economic fundamental has been an issue of much interest and contention in empirical finance. Notable recent contributions include Cochrane (2008), Lettau and Van Nieuwerburgh (2008), Welch and Goyal (2007), and Ang and Bekaert (2007). The accumulated empirical evidence is extensive, but the consensus on the predictability of stock return is rather weak. Some authors believe that key financial indicators have

the ability to predict stock return (e.g., Lettau and Ludvigson (2005); p.942), while others have found mixed and conflicting results (e.g., Welch and Goyal, 2007; p.1455). While the studies for the U.S. market dominate the extant literature, the case of non-U.S. markets has received attention only recently: see Wohar, Rapach, and Rangvid (2005), Schrimpf, (2010), Hjalmarsson (2010), Giot and Petitjean (2011), and Jordan, Vivian, and Wohar (2014a, 2014b). On the other hand, using the U.S. data, Neely, Rapach, Tu, and Zhou (2014) provide evidence that technical indicators show much stronger ability to predict stock return than financial ratios.

An important methodological issue in the literature of predictive regression is the Stambaugh (1999) bias. It occurs when a predictor is treated as exogenous to stock return, while it is in fact endogenous. That is, a shock to the predictor is often strongly correlated with that of stock return. Ignoring this endogeneity causes an upward bias in the estimation of predictive coefficients in small samples. As discussed in Lewellen (2004) and Cochrane (2008), this upward bias can lead to a serious over-statement of predictability and spurious rejection of the null hypothesis of no return predictability. This is particularly so when the predictor is persistent and the degree

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² All computations are conducted using the VAR.etc package (Kim, 2014c) based on R (R Core Team, 2014). The R codes used in this paper are available from the authors on request.

of endogeneity is high, which are the typical features of popular predictors such as the dividend-yield.³ To mitigate the Stambaugh bias and conduct bias-corrected estimation and statistical inference, Amihud, Hurvich, and Wang (2009, 2010) propose the augmented regression method (ARM), which is modified by Kim (2014a) for improved small sample properties and implementation. Amihud et al. (2010) and Kim (2014a) apply their methods to the U.S. stock returns and report the evidence that the dividend-yield shows little predictability for stock return, in contrast with the past results which show strong predictability.

While several studies have assessed the predictability of stock return of international markets, they have adopted different models and methods. Wohar et al. (2005) and Jordan et al. (2014a) examine the return predictability of a number of European and international stock markets, but their predictive regression treats the predictor variable exogenously. Hjalmarsson (2010) uses the panel regression methods for the stock returns of a large number of global markets, adopting a pooled estimation method which provides estimation and testing outcomes free from the Stambaugh bias. Schrimpf (2010), adopting the ARM of Amihud et al. (2009), reports that the return predictability of international stock markets is not uniform across countries. Neely et al. (2014) assess the predictive ability of technical indicators, but based on the predictive regression without making the adjustment for Stambaugh bias. All of these past studies set the lag order of predictive model to one, which may be subject to model specification bias.

This paper is a fresh and comprehensive study for the return predictability of international stock markets. Using monthly data from 2000 to 2014 for 16 Asia-Pacific and 21 European markets, we examine the predictive ability of financial ratios (dividend-price ratio, dividend-yield, earnings-price ratio, dividend-payout ratio), technical indicators (price pressure, change in volume), and short-term interest rates. In addition to the improved ARM of Kim (2014a), we employ a wild bootstrap test based on a restricted vector autoregressive (VAR) form of predictive model for stock return. The latter is a non-parametric (based on data resampling) alternative to the former, providing statistical inference robust to non-normality and (conditional) heteroskedasticity. We note that these two methods show highly desirable small sample properties (see Kim & Shamsuddin, 2014), and can be implemented to a predictive model with a general lag order higher than one.

Our study finds that all financial ratios appear to be weak predictors for stock return, with poor in-sample and out-of-sample performances. In contrast, the price pressure (a momentum indicator) is found to be a strong predictor for nearly all stock markets, with large effect sizes and accurate out-of-sample forecasts. In addition, the short-term interest appears to be a strong predictor, both in-sample and out-of-sample, especially for European stock markets. In the next section, we present a brief survey of past empirical studies on stock return predictability for international (non-U.S.) stock markets. Section 3 presents the data details, and Section 4 the methodologies. Section 5 presents the empirical results, and Section 6 concludes the paper.

2. Literature review

Despite a large number of studies on stock return predictability for the U.S. stock market, the existing literature on the predictability of stock return of non-U.S. markets, including those of Asia-Pacific and Europe, has not been extensive. Since the studies on the U.S. market are well-documented in the literature, we provide a list of

the studies for the non-U.S. markets: see Table 1 for a review of selected studies on the stock return predictability in Asia-Pacific and Europe.

Bossaerts and Hillion (1999) investigate the predictability of excess stock return for 14 countries, using four predictors (dividend-price ratio; earnings-price ratio; and short-term and long-term interest rates) covering the period 1956–1995.⁴ They select the best predictive regression models from seven model selection criteria, with some are robust to non-stationary predictors. They find evidence of in-sample predictability but no out-of-sample predictability. Hjalmarsson (2010) adopts the panel regression methods for the stock returns from 40 international markets, including 24 developed and 16 emerging economies, using four common predictors (dividend-price ratio; earnings-price ratio; short interest rate; and term spread), using monthly data over the period 1950–1987. Based on a pooled estimation method which provides estimation and testing outcomes corrected for the Stambaugh bias, Hjalmarsson (2010) finds that the dividend-price and earnings-price ratios show a limited predictability for stock return, but the interest rate variables are found to be robust predictors in developed markets. Jordan et al. (2014a) investigate return predictability for 14 European and Mediterranean countries, including developed and emerging markets, Euro and non-Euro currency countries, as well as small and medium-sized economies. They use monthly fundamental-price ratios, macroeconomic and technical variables, covering the period 1995–2011. They find some evidence that predictive ability of fundamentals is related to liquidity and market development, and technical variables provide larger economic gains in both larger and more developed markets. Their results suggest that the predictability can differ depending upon a country's size, liquidity and development.

Wohar et al. (2005) examine return predictability using monthly macroeconomic variables data in 12 industrialized countries, using the data from the early-to-mid 1970s to the late 1990s. They find that interest rates are the most consistent and reliable predictors of stock returns across countries, while the inflation rate also appears to have important predictive ability in certain countries. Jordan et al. (2014b) analyze return predictability for 11 Asian countries over the period 1995–2011, using monthly data for three types of predictors (fundamental, macroeconomic and technical variables). They find that the performance of fundamental-price ratios and macroeconomic variables as well as some technical variables shows evidence of predictability. Schrimpf (2010) examines return predictability in five major international stock markets, using a monthly data set of nine financial and macroeconomic predictors, covering the period 1973–2007. He finds, adopting the ARM of Amihud et al. (2009), that interest-rate related variables are usually among the most prominent predictive variables, whereas valuation ratios perform rather poorly. Further, he reports that the return predictability of international stock markets is not uniform across countries. Giot and Petitjean (2011) examine the predictability of stock returns in 10 international markets using a linear predictive regression model applying the Stambaugh (1999) and Lewellen (2004) correction methods, using the data to 2005 and considering five traditional predictors. Their out-of-sample analysis shows that the short-term interest yield is the most informative predictor of stock returns.

Some studies focus on the UK stock market. McMillan (2003) considers nonlinear smooth-transition threshold models to analyze the predictability of UK stock market returns with a variety of financial and macroeconomic variables over the period 1975–1995. Their result shows that the exponential smooth transitions threshold model improves both the in-sample fit and out-of-sample forecast of the data over both the linear and logistic smooth transitions threshold alternatives, based on dividend yield, industrial production and

³ It is well documented that most variables employed in predictive regressions are highly persistent with autoregressive roots extremely close to unity (see, e.g., Cavanagh, Elliott, and Stock, 1995; Campbell and Yogo, 2006; (Kostakis, Magdalinos, and Stamatiogiannis, 2015)).

⁴ The beginning date is different according to the country.

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