International Review of Financial Analysis 18 (2009) 84–93

Contents lists available at ScienceDirect

International Review of Financial Analysis

Heterogeneity in asset allocation decisions: Empirical evidence from Switzerland

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ARTICLE INFO

Article history:
Received 10 October 2006
Received in revised form 2 October 2008
Accepted 4 October 2008
Available online 22 October 2008

JEL classification:
E44
G11
E32
C32

Keywords:
Asset allocation
Stock return predictability
Business cycle
Investor heterogeneity
Vector error correction

ABSTRACT

We analyze the heterogeneity in asset allocation decisions of different investor groups in response to changes in the macroeconomic environment. Using a new data set that includes the monthly portfolio holdings of private, commercial, and institutional investors deposited with Swiss banks, we estimate the relationship between equity and bond holdings and common business cycle indicators. Regression analysis indicates that private investors do not systematically move from stocks into bonds by selling stocks to institutional investors and purchasing bonds from them in adverse macroeconomic states. A VAR-error correction framework including cointegration and error correction restrictions suggests that the investment behavior of commercial investors leads and private investors follow in their investment decisions only slowly over time. The asset allocation decisions of institutional investors are not affected by the actions of private and commercial investors. Our results refute a principle of "institutional irrelevance".

1. Introduction

Standard asset pricing models assume that assets are held by a representative agent (Lucas, 1978). Investor heterogeneity in asset allocation decisions is not explicitly taken into account.[4] Looking at different investor groups, however, seems crucial to explain asset prices. For example, Mankiw and Zeldes (1991) suggest that consumption-based asset pricing models work only if the consumption data of investors are used. Similarly, Cohen (2000) argues that the whole market is a bad proxy for the asset allocation decisions of individual investors. His empirical results suggest that institutions buy stocks from individuals when the expected stock market return increases. The generally high degree of trading activity observed in financial markets imposes a great challenge. Many theoretical models (Aumann, 1976; Milgrom & Stokey, 1982) argue that there should be no trade at all. However, Odean (1999) not only documents that investors engage in substantial trading activity, but his results also suggest that many investors lose money even before trading costs. Our paper contributes to this strand of the literature by investigating how different investor groups shift the composition of their portfolios in response to changing business cycle conditions and/or time-varying expected stock market returns. A related question we examine is whether the investment behavior of one investor group leads and others follow in their asset allocation decisions.

Although the asset holdings of institutional investors exceed the direct individual holdings in the G-7 countries,[5] the bulk of the empirical research has looked at investment decisions of retail investors (Barber & Odean, 2000; Odean, 1999).[6] We consider three investor groups: private investors, commercial investors, and institutional investors. Our data are from the Swiss National Bank (SNB) and include monthly portfolio holdings of these investor groups deposited

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[4] Rubinstein (1974) and Constantinides (1982) describe the circumstances in which heterogeneous agents aggregate to a representative agent. Dumas (1989) and Constantinides and Duffie (1996) model economies that have two agents with different preferences.

[5] As of 1997, the ratio of institutional to direct asset holdings was 1.5 in the G-7 countries, on average. Institutional holdings equal roughly 100% of the gross domestic product in the G-7 countries and 200% in the US and the UK (Davis & Steil, 2001).

[6] Exceptions are Yang (2002) and Alexakis, Niarchos, Patra, and Poshakwale (2005). Yang (2002) examines the information spillover between stock returns and the trading behavior of institutional investors in Taiwan, while Alexakis et al. (2005) investigate the relationship between stock returns and mutual fund flows in Greece.

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doi:10.1016/j.irfa.2008.10.001

with Swiss banks between November 1998 and November 2004. We document that private investors do not systematically move from stocks into bonds by selling stocks to institutional investors and purchasing bonds from them in adverse business cycle states, that is, when the expected stock market return tends to be high. Private investors hold a smaller fraction of all outstanding stocks *and* bonds during bad times. These findings contradict those in Cohen (2000) and Cohen, Gompers, and Vuolteenaho (2002). One potential explanation is that private investors are more recession sensitive than institutional investors because of their strong dependence on labor income. Moreover, our results suggest that commercial investors lead, and private investors follow in their asset allocation decisions only slowly over time. The investment behavior of institutional investors is not systematically affected by private and commercial investors. These results could be explained by better information available to commercial investors or regulatory restrictions imposed on institutional investors. Taken together, our findings refute a principle of "institutional irrelevance".

While our approach explores a unique data set, a problem that inherently plagues our analysis is that the differences in the portfolio holdings across investor groups may not only result from trading subsequent to changes in the business cycle conditions. Depending on a portfolio's initial composition and risk exposure, stock and bond market movements will have different effects on the structure of asset holdings. Any observed investor heterogeneity can be driven by both volume and price effects, but the lack of investor specific returns does not allow us to disentangle them.

Investor heterogeneity is necessary to explain differences in asset allocation decisions. The hedging demands in intertemporal asset pricing models are one reason for investor heterogeneity. If the investment opportunity set is constant and investors have homogeneous expectations, two-fund separation applies and intertemporal portfolio maximization can be treated as if investors had a single-period utility function (Fama, 1970; Samuelson, 1969). Except for periodic rebalancing, investors will not shift the composition of their portfolios. In contrast, if investor preferences and future investment opportunity sets are state-dependent or if future investment opportunity sets are partially unknown, additional intertemporal hedging demands generate trading. Merton (1971) shows that changes in risk aversion induce rational investors to adjust their portfolio holdings differently, even if investors' expectations are homogenous. Heterogeneity of beliefs, as it is assumed in Williams' (1977) version of the capital asset pricing model, also induces trading and results in different asset allocation decisions. In these models, investor heterogeneity will be reflected in different asset allocation choices and portfolio adjustments subsequent to changes in business cycle conditions and/or expected stock market returns. Macroeconomic variables usually serve as proxies for the unobservable state variables. If investors' expectations about these variables or their risk aversion differ, their asset allocation decisions will be affected through the impact on the discount rate applied to future cash flows (Chamberlain, 1996; Ferson & Harvey, 1993; Solnik, 1993). Other rational motivations for trading are portfolio rebalancing consistent with standard mean-variance theory (Fama, 1970; Samuelson, 1969), tax-loss trading (Grinblatt & Keloharju, 2001), and life-cycle considerations (Bodie, Merton, and Samuelson, 1992; Viceira, 2001).

Rational asset pricing models do not explain what constitutes utility for investors. De Bondt (1999) provides a portrait of the individual investor, who is prone to judgment and decision-making errors. Behavioral finance attempts to explain financial market outcomes due to systematic violations of central axioms of rationality, such as loss aversion (Odean, 1998), misguided beliefs in contrarian or momentum that might be evidence of overconfidence (Daniel, Hirshleifer, and Subramanyam, 1998), herding behavior and feedback trading (Bikhchandani & Sharma, 2001; Dennis & Strickland, 2002), or love of gambling. Private and institutional investors are both human beings and will, in this sense, behave in a similar way. To which extent theses behavioral elements are useful in explaining investor heterogeneity and, in particular, in discriminating between individual and institutional investors is an unsettled issue (Gervais & Odean, 2001; Nofsinger & Sias, 1999; Shapira & Venezia, 2001).

Institutional investors are, on average, better informed and diversified than private investors (Blume, Crocket, and Friend, 1974; Ivkovic, Sialm, and Weisbenner, 2008; Yang, 2002). While behavioral issues will play a role, however, institutional decision making is restricted through agency problems. Menkhoff (2002) argues that incentive structures are the main driver for the different behavior of private and institutional investors. Recent evidence substantiates this view that the investment behavior of institutional investors is characterized by short-termist, overly risky, and only seemingly competent approaches (Brown, Harlow, and Starks, 1996; Chevalier & Ellison, 1997; Sirri & Tufano, 1998).

Other reasons for investor heterogeneity could stem from the regulatory environment. Compared to other jurisdictions, the Swiss law is fairly liberal and gives institutional investors a wide flexibility in their investment policy. Pension funds, which are the most influential investment force among Swiss investors, are allowed to invest up to 50% of their funds in equities or equity-like securities. Even this restriction can, however, be relaxed if the fund follows a sophisticated and externally audited investment strategy.[7] Insurance companies are slightly more regulated. Nevertheless, the behavior of pension funds and (in particular, life) insurance companies can be expected to be positively correlated because they follow similar investment objectives in terms of maintaining specific loss restrictions or minimum return targets. Mutual funds, on the other hand, operate under a new law which includes a broad range of investment vehicles (for example, certain types of investment companies and hedge-fund type structures).[8] Overall, the Swiss law is extremely flexible in terms of imposing investment restrictions for institutional investors. Ex ante, therefore, it is unclear whether or not their aggregate investment behavior distinguishes from the patterns observed for other investor groups.

The structure of the paper is as follows. Section 2 contains a data description. Section 3 introduces the methodology and presents our main empirical results. Possible interpretations of the results are discussed in section 4. Section 5 concludes and provides an outlook for further research.

2. Data description

2.1. Total portfolio holdings

The data on portfolio holdings are taken from a survey conducted on a monthly basis by the Swiss National Bank (SNB). They include the portfolio holdings deposited with 342 banks located in Switzerland and Liechtenstein and cover about 95% of the total value deposited. Portfolio holdings are measured at market prices and converted into Swiss francs. The data are disaggregated according to the type of the investor, the residence of the investor and the issuer (domestic or foreign), the category of securities, and their denomination currency (Swiss franc, US Dollar, Euro, Pound, or Yen). We consider three different groups of investors: private investors (*PRIV*), commercial investors (*COMM*), and institutional investors (*INST*). Private investors comprise individuals that are employed, self-employed, out of the labor force or retired, and students. Commercial investors include non-financial companies, governmental entities, and non-profit organizations. Institutional investors consist of financial companies,

[7] See "Verordnung über die berufliche Alters-, Hinterlassenen-und Invalidenvorsorge" (BVV 2), 3. Abschnitt, Art. 55. Deviations from this equity allocation limit are possible since 2000, but they require an external audit report on behalf of the fund management. According to the Swiss Pension Funds Association, the share of equities in the portfolios of Swiss pension funds amounted to 39.6% by the end of 2002, with 16.9% invested in Swiss stocks and 22.7% in foreign stocks.

[8] The "Kollektivanlagegesetz" (KAG) is effective since 2007 and replaces the former, more narrowly focused "Anlagefondsgesetz" (AFG) dating back to 1994.